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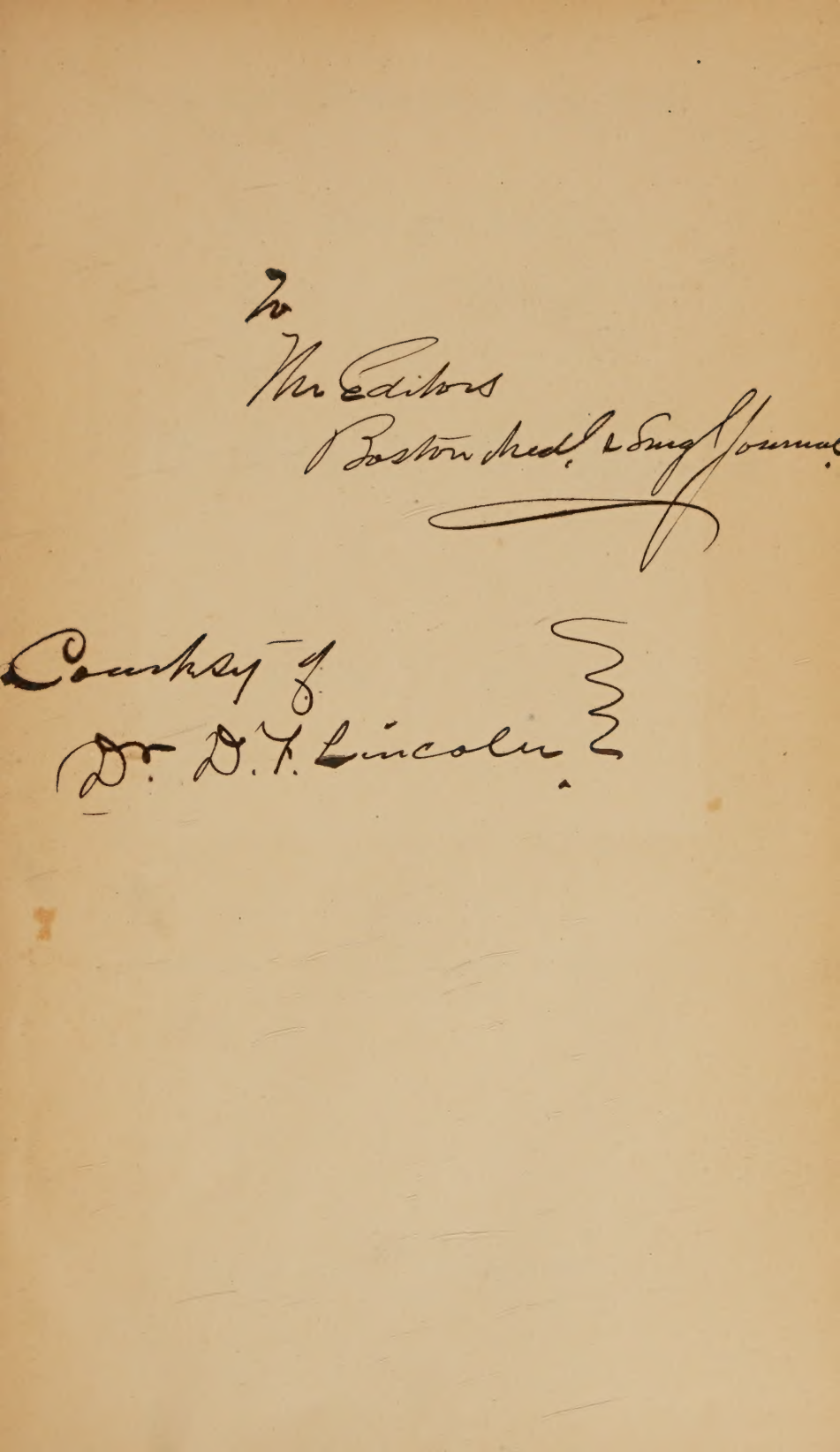


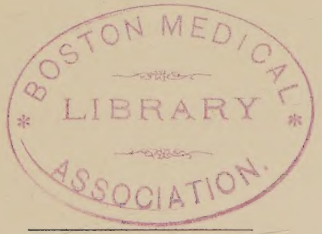
THIRD ANNUAL REPORT

OF THE

STATE BOARD OF HEALTH

OF

NEW YORK.



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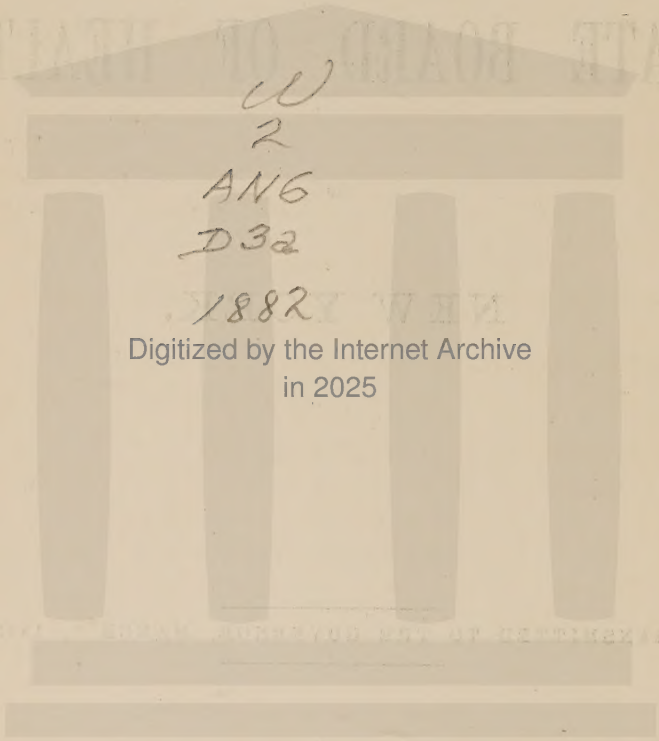

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STATE OF NEW YORK.

No. 110.

IN ASSEMBLY,

MARCH 12, 1883.

STATE OF NEW YORK:

EXECUTIVE CHAMBER,
ALBANY, *March* 12, 1883.

To the Legislature:

I have the honor to transmit herewith the Third Annual Report of the State Board of Health.

GROVER CLEVELAND.

THE STATE BOARD OF HEALTH OF NEW YORK.

MEMBERS OF THE BOARD.

State Commissioners of Health; appointed by the Governor and Senate.

ERASTUS BROOKS, West New Brighton, Richmond Co.
J. SAVAGE DELAVAN, M. D., Albany.
ELISHA HARRIS, M. D., New York, P. O. address, Albany.

Appointed by the Governor from the Health Commissioners in Cities.

EDWARD M. MOORE, M. D., Rochester.
PROF. CHARLES F. CHANDLER, Columbia College, New York.
JAMES G. HUNT, M. D., Utica.

Ex-Officio Members.

WM. M. SMITH, M. D., Health Officer of N. Y., Quarantine, S. Is'd.
JAMES T. GARDNER, Sup't of State Survey.
LESLIE W. RUSSELL, Attorney-General.

OFFICERS OF THE BOARD.

President.

DR. EDWARD M. MOORE, Rochester.

Secretary.

DR. ELISHA HARRIS, Central Office of the Board, Albany.

State Superintendent of Registration and Vital Statistics.

DR. ELISHA HARRIS, as Secretary of the Board.

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REPORT.

To His Excellency GROVER CLEVELAND, *Governor of New York:*

SIR — The State Board of Health presents, in its third annual report, a brief statement of its transactions, and an account of the work performed under its supervision and of the progress in organization and service of local sanitary authorities.

The law under which this Board was created specified certain duties of first importance, in the nature of sanitary inquiry and advice, and of coöperation with local authorities, the exchange of information with, and giving of aid to them, and the acquirement of information and the registry of records relating to health, diseases and mortality. These duties have continued to receive attention, while under the several laws which the Legislature has since enacted for the preservation of the public health various additional requirements have been laid upon this Board. These duties are very clearly defined and guarded in the several laws by which they are imposed, and they alike emphasize the spirit and purposes of the organic act of 1880 that has shaped the work thus far undertaken.

As shown in the first and second annual reports, this Board has, from the first, regarded the successful local sanitary service by boards of health in towns, villages and cities as the most essential step toward any general and permanent sanitary improvement and well-regulated public health service. For this reason the amendment and harmonizing of the general law for the preservation of the public health, as completed by the Legislature in 1881 and 1882, is regarded as giving a good foundation for a correct and popular system of local sanitary government throughout the State. Under this amended general law every town and city must have a local board of health; and every incorporated village is likewise authorized to have its local board, under conditions that shall keep it free from incompetent interferences; and, when a village board of health is so organized and acting, the town and village expenses for the public health service become entirely distinct, and the two boards are incited to an efficient and economical administration of their clearly-defined duties within their respective jurisdictions.

To the local boards of health, under the amended laws, has been transferred the responsibility and authority for enforcing complete registration of vital statistics, under the supervision of the State Board. This became necessary in view of the indispensable importance of con-

stant sanitary watchfulness over the causes and circumstances of mortality, the adoption of protective measures against infectious diseases, the sanitary regulation of burials and the transit of remains of the dead by public carriers. The immediate registry of births is regarded as a sanitary duty. The records of marriages could not, under existing statutes, be conveniently separated from other branches of vital statistics. The local registry clerk has other relations to the local government, and, therefore, does not increase the usual list of local officials. In all respects the general statute for the preservation of the public health, as now administered by local boards, with advice and coöperation given by the State Board, is proving to be a beneficent, acceptable and economical basis of local sanitary government. The organization and maintenance of the local boards of health and their systematic service enables every community to acquire and apply the most essential kinds of sanitary knowledge and the means for protecting and improving the public health; while through the agency of these boards and the enlightened interest which they awaken, each and all of the communities in the Commonwealth may now derive benefit from the State Board of Health. This is being daily exemplified in the Board's service. Its greatest benefits are most widely extended at the least cost and with only a minimum of interference, and yet with any necessary support of local action when required. The apprehensions expressed by many worthy citizens, at first, that the State Board was not endowed with adequate authority in the great work confided to it, are now believed to be groundless, especially as the executive orders of Governor, based upon the investigations and conclusions of this Board, are faithfully complied with. Examples of the practical operation of this feature of the organic law in this service are given in a subsequent section of this report.

Certain new duties which have devolved upon the Board under the Act for Preventing the Adulteration of Food and Drugs (chapter 407 of the Laws of 1881), and under the Act for Regulating the Safety-standard and Testing of Illuminating Oils (chapter 292 of the Laws of 1882), are described and also illustrated in numerous chapters by expert chemists in the appendix of this report. It is due to the public as well as to this Board to state, in this place, that all the procedures and a great amount of scientific investigation, pursued in obedience to these two new laws, have been ordered and pursued with all the prudence, justice and conscientiousness possible, and as regards the expenditures upon these added duties the business accounts of the Board are so kept that the cash expenses upon each of them are separately exhibited in the monthly and the annual statements by the finance committee and in the office accounts.

SUBDIVISIONS OF THIS REPORT.

The Public Health and Prevalent Diseases in the State during the past year.

Vital Statistics of the State.

The Local Boards of Health and the Practical Operation of the Amended Sanitary Laws relating to them.

Work of the Board on Appeals from Citizens and Local Boards, and as required in the cases referred to the Board by the Governor.

Results of Procedures under section eight (8) of the State Board of Health Law.

Results of Sanitary Drainage as aided by the State appropriation in 1881 to drain the swampy beds of certain abandoned canals.

Financial Statement — Expenditures and Resources of the Board.

The Law to Prevent Adulteration of Food and Drugs (chapter 407, Laws of 1881).

The Law to Prevent the Dangerous use of Explosive Illuminating Oils (chapter 292, Laws of 1882).

School Hygiene.— Progress of Efforts to Promote Health in the Schools.

Malaria and the Miasmatic Diseases.

Sanitary Surveys and Maps.— Drainage and Drainage-Areas.

Sewers and the Sewerage Problems in the large villages and small cities.

House Drainage and Sewerage ; and the Sanitary Problems of House Plumbing.

Tenement Sanitation and the Sanitary Regulation and Supervision of Tenement Houses.

The Protection of Health and Life in Railway Traveling.

The State Quarantine System and the Sanitation of Emigrant Ships and Emigrant Trains. Contagion and Vaccination in the movement of Emigrants from Europe.

The Small-pox Scourge — The Public Duty and Provision of Vaccination. Bovine Virus and the Public Health Duty concerning it.

Certain improvements of Laws needed.

Conclusions and Recommendations.

The Public Health and Prevalent Diseases in the State in 1882.

The general health of the people throughout the State the past year has gained by the unusual and almost universal prosperity of their industrial pursuits, the abundance of the best food products, and the increase of domestic improvements.

Other circumstances which are steadily contributing to the means of health and the protection of life will here be mentioned, yet there is such ample evidence that the industry and thrift which prevent want and provide for improvements and comfort of homes and people that these are worthy of prominent recognition wherever found; and especially, as the absence of them will be conspicuously noticeable among vast numbers of the more unfortunate classes that not only suffer excessively and feel the heaviest pressure of mortal diseases, but in turn most perilously, themselves endanger the public health. It is a grave fact that among the 5,200,000 and upwards of the people in this State there are probably nearly 1,000,000 whose dwellings and physical conditions invite and often propagate diseases. In these unthrifty classes which abound in the large cities, their records of sickness and mortality show where and why there has continually been great need of safeguards for the public health.

In the midst of abundance and prosperity, as well as in the dwellings of the least favored, a very few diseases the past year have caused fully

one-half of all the deaths in the State. These few are admitted to be the most preventable and untimely causes of mortality; yet the very names of them are household words, and until recently these diseases were mostly regarded as inevitable. As it is with these that the local sanitary authorities and the State Board are required to deal with considerable power of interference, this Board has organized such methods of procedure, and such safeguards as seem now most practicable, and has endeavored to incite such sanitary activity and improvements as will most successfully reach and control the physical circumstances which make up the avoidable or preventable causes of these evils. In this endeavor the masses of the people had, in the first place, to become interested and earnestly enlisted. The thorough organization of local sanitary boards, under general laws, has, consequently, been a paramount duty, and this has already resulted in enlisting a great proportion of intelligent citizens and their families in a true self-concern for such matters and for speedy and effectual application of ways and means of defense against the preventable sources of destructive diseases.

THE ACUTE INFECTIOUS OR CONTAGIOUS DISEASES.

Early childhood suffers the heaviest losses by infectious diseases. Diphtheria, scarlet fever, small-pox and measles, the chief of these are destructive at all seasons and in country and cities alike, yet in the denser populations, as in New York, Brooklyn, Albany, Troy, Buffalo and the large manufacturing villages, the specific contagion as well as contributing conditions of causation will not as readily be exterminated as in rural communities. In the latter during the past year there have been fewer outbreaks and epidemics from these maladies than in the previous two years, but in some of the large cities they have been unusually fatal and prevalent. No exotic contagions, except small-pox, have seriously added to the common dangers ever present from these diseases in various parts of the State. The occasional outbreaks of small-pox in the metropolitan district and at Buffalo, in and about the lodging-places where recently arrived emigrants were congregated, have amply shown the necessity for all the sanitary care given to this source of danger by both State and National authorities. Important evidence on this subject, and concerning the means by which each of the controllable kinds of prevalent contagious diseases are spread, will be given in subsequent sections of this report.

Diphtheria.— The persistent prevalence of this disease in the cities and many of the populous villages is inciting more exact and comprehensive investigation of its essential nature and the causes that propagate and perpetuate it. Its ravages are so relentless and sudden ; its fatality so excessive, even where life and domestic health are supposed to be most secure; and the total losses by this one destroyer are so enormous, that no efforts have been spared by the State Board of Health to induce and aid the organization of the best known sanitary measures to repress the causes and spreading of this malady. After two years, the experience and testimony of this Board and many of the best local health authorities in the State fully warrant the belief that progress is being made in the successful application of sanitary means which repress and limit the prevalence and fatality of this malady.

Of course, there will be occasional resistance against the best sanitary measures, and there must continue to be more or less medical skepticism in regard to particular factors in the propagation and spread of the disease until the nature of the contagious attribute of it is indisputably established; but the public health officers who, with only the existing light they have, should fail to advise and organize sanitary precautions against both the contagious and the contributing causes of diphtheria could not be acquitted of the charges of incompetency and unfaithfulness. Even the few physicians who continue to disregard the necessary sanitary duties in this matter find themselves arraigned before the highest standard of medical judgment. This Board has secured the attention and almost unexceptional adherence of local sanitary authorities to the duty of requiring the proper isolation or domestic quarantining of the sick; and, at the same time, of diligently searching out all local circumstances by which the disease has begun its course or is spreading.

The total mortality by diphtheria in the State cannot yet be told. The most accurate statistics at hand show that in several of the cities about six deaths in every one hundred from all causes are charged to diphtheria. The two cities of New York and Brooklyn, in 1881, buried 3,410 dead from this disease. This is about six per cent of the total mortality from all causes in those cities. In smaller communities, as in certain hamlets and mountain and hill towns mentioned in the former reports, this cause of death has been equal to twenty-five, thirty and forty per cent of the total by all causes. So, also, in separate families, wherever this scourge prevails, it often occurs that more than half of the members, sometimes all in large groups of children, perish from it.

Scarlet fever.— The total mortality from this disease, as reported, seems to be equal to that from diphtheria. Its prevalence is generally more widespread in the State than any other disease that requires quarantining and disinfection. The beneficent results of the regulations adopted by local boards of health to secure complete isolation of sick, the disinfection of premises and material, and the systematic protection of the public schools against their special exposure to the introduction of its contagion, are already being witnessed very extensively. There has been a great increase of saving knowledge among the masses of the people in regard to the duty of completely isolating the sick of this disease and thoroughly disinfecting all known sources of its contagion. There still are witnessed occasional attempts to discredit this duty by voluntary advisers in the towns and villages where an incompetent practitioner among the people denies the fact that scarlet fever is contagious, while he advises or organizes opposition to the sanitary rules and duties that would treat it as being a dangerously infectious disease. Happily such local controversy has, in every instance, resulted in the voluntary popular support of the local sanitary authority. The last of all the objections to sanitary rules and interference in regard to this matter, as much with reference to diphtheria as to scarlet fever, related to the sanitary impropriety of public funerals and the prohibition of exposure to the unburied remains of the dead. Nearly every board of health in the State has deliberately adopted and enforced the necessary rules to prevent these dangerous practices. Local

opposition has ceased. The prudence and firm convictions of sanitary officers have won this success, aided by the press and the State Board of Health. The extermination of scarlet fever from school-rooms, by rules of exclusion of all attendants from families and dwellings where it has begun to appear, and by the complete disinfection of apartments and materials that have been exposed to the sick, is the published rule of public duty throughout the State.

Measles and whooping-cough. — Though these two most common maladies of children are charged with a great number of deaths, their fatality is chiefly certified as resulting from the pulmonary disorders which they induce. Healthfulness of habitations, and a reasonable avoidance of public exposure of the sick with these spreading diseases—now generally advised by medical and school officers—appear to meet the sanitary requirements for repressing their prevalence. The most fatal results of these two maladies reported during the year were in crowded asylums for young children where no adequate means were present for removing the sick from the other inmates. It is worthy of a record by this Board that in certain large country homes, with extensive grounds and numerous buildings for the care of city asylum infants and children, the prevalence and fatality of measles and whooping-cough have been controlled with marked success by the sanitary measures which are now being recommended by local boards of health.

Small-pox in the State. — During the year there has not been an instance in which an outbreak of this contagious pest has not been subjected to sanitary control by the local health authorities, as soon as the State Board obtained the facts upon which procedures could be advised or ordered. This statement relates to all other communities than the cities which have adequate health ordinances and means at hand to meet their sanitary necessities. Experience is proving that prompt and complete quarantining of small-pox is not resisted in any community where there is a competent health officer and a well-organized board of health. The dread of this loathsome contagion induces a ready compliance with the most essential sanitary rules.

In each of its previous annual reports this Board has briefly reviewed its experience and records of coöperation with the local sanitary authorities in the warfare upon small-pox. During the year and a half to which those reports relate, at the beginning of local organization of sanitary duties, the chief source of delay and uncertainty of adequate control of contagion as well as of providing for general vaccination consisted in the defect or the absence of local sanitary authority. This difficulty is, at least, overcome, and, under the amended general health law, the ordinary town board of health vies with the boards of cities and large villages in promptness and efficiency whenever small-pox is reported or general protection by vaccination and revaccination is advised.

While it is probably true that no State in the Union, during the past year, escaped this dreaded disease more generally than New York, still it was reported to this Board from sixty localities, and in upwards of one hundred and fifty different houses, besides being almost constantly present in Brooklyn, Long Island City and New York. The distribution of these outbreaks was very widespread, extending from the east end of Long Island to the western frontier of the State.

In all of the sixty places here referred to, the local sanitary authori-

ties promptly put themselves in communication with the State Board, adopted strict measures of isolation of the sick and resorted to systematic vaccination. By these means the spread of the contagion was promptly arrested, and the number of fatal cases kept at a minimum.

The utility of vaccination has never been more significantly demonstrated than in the experience of local boards of health in this State during the past year. The importance of having at hand pure and trustworthy vaccine virus for public and private uses, ever ready for instant demands for it by telegraph and mail, has been proved in most, if not all, of these sixty outbreaks above mentioned.

The first outbreak of importance was reported at the beginning of 1882 from the Soldiers and Sailors' Home, Bath, Steuben county, where late in November, 1881, a new inmate was admitted who proved to be infected with small-pox. Dr. Wylie, the surgeon of that institution, reported upon that outbreak, as follows: "About the time mentioned in complaint, there was a man admitted to the Home, recently from the city of New York, who, a few days after admission, broke out with marked varioloid symptoms. The man was immediately isolated from the inmates, and well taken care of by a competent nurse.

"The inmates were at once quarantined, and recent bovine crusts were obtained by telegraph from the drug-house of Frazar & Lee, of New York city; and all of the inmates were thereupon immediately vaccinated by myself, with the assistance of Dr. Cruttenden, of Bath, with excellent results.

"It is true, many had sore arms, not more so, however, than usually occur. Not a single case of a serious character was known to exist, and I am happy to state that, by prompt and thorough action by the managers of the Home, serious results were avoided, as there was no spreading of the disease in this vicinity." (A full account of this matter is given in a subsequent chapter.)

During the last week in December, 1881, the remains of two brothers who had died of small-pox at the pest refuge on Blackwell's Island, a few months previously, were, after burial in the town of New Lots, Kings county, conveyed through the cities of Brooklyn and New York in an improper manner, and placed in a baggage car for transportation by the N. Y., L. E. & W. R. R. to Wellsburgh, Chemung county. On the 9th of January the local sanitary authority at Wellsburgh, the health officer at Elmira, and the village authorities of Hornellsville brought this dangerous act to the attention of the State Board of Health, and it became the occasion for adopting stringent regulations and specific instructions to all railway and express carriers concerning the transportation of the dead from contagious diseases. Immediate vaccination and the effectual disinfection of every thing exposed put an end to the danger that had then been incurred.

In the town of Catskill, a case of small-pox occurred which led to the adoption of vaccination and re-vaccination throughout all the public schools, and generally throughout the families in that town. The returns of the local health officer show that there were 3,488 persons vaccinated in a total population of about 8,000. The result has been that for a period exceeding one year, that town has remained free from small-pox though its population has been far more exposed than the average population of the State. This sanitary work was

performed in accordance with the law relating to vaccination of school children, and the regulations of the local boards of health.

During the last of the year 1881, and early in the winter nearly twenty cases of small-pox occurred in the city of Lockport. All except one were traced to the house of an undertaker, whose wife died of small-pox which was falsely reported by a less alarming name. In a few weeks the population was thoroughly protected by vaccination, at a cost a little less than $4,000. A contagious disease refuge became one of the useful means of limiting the spread of the disease and at the same time furnishing a suitable house of recovery.

In the city of Rochester, during the prevalence of small-pox at Lockport, and with inter-communication almost every hour, there occurred four limited and vigilantly guarded outbreaks. The first two were traced directly to infected persons arriving from Chicago. The city health commissioners immediately organized an efficient vaccinating corps, assigning to each vaccinator a definite district. The several vaccinators, together, soon brought in an account of 25,141 vaccinations, 9,188 being at the public schools, 2,110 being among factory operatives, vaccinated at their places of labor, and 13,843 being house-to-house vaccination. These 25,141 exhibit simply the gratituous service of the municipal board of health. Only $7,133.20 was expended upon this free service. The average cost was about twenty-nine cents for each person vaccinated. The result was such as to secure entire immunity of the business interests as well as of the vastly greater interest of life in that city. It is said that the city received a commercial benefit fully equal to $1,000,000 by being thus protected against alarm and danger.

In the village of Canajoharie, a commercial traveler who was lodging at the largest hotel, and though suffering from a light attack of varioloid, he spent the evening socially, and next morning received the attention of a barber in his shop. The lady in his company the previous evening, and the barber who served him in the morning, both in the hotel, became victims of the contagion, and in time communicated it to others. Delay and insufficiency of official measures for the protection of the community cost many lives and occasioned great injury to business interests. No less than twenty cases, and six separate notifications of fresh outbreaks, all traced to the commercial traveler, were communicated to the State Board. At last vaccination and re-vaccination extinguished the material upon which the contagion was burning its way through the township.

Early in June a case of small-pox occurred in the town of Rhinebeck, which was traced to the corpse of a child, unlawfully brought into that town from Jersey City. The contagion began to spread, when strict quarantine and general vaccination put an end to it.

During the month of June small-pox appeared among "rag-sorters" employed in a paper mill in South Glens Falls (town of Moreau), and cases were found among these employees at Sandy Hill, town of Kingsbury, and in the village of Glens Falls in the town of Queensbury, on the opposite side of the river from Moreau, which is on the west side. The boards of health in those towns and villages, respectively, acted promptly and effectually. Vaccination soon entirely suppressed the progress of the contagion, the sick meantime having been quarantined rigorously.

On the 22d of June, the canal boat "Caroline" left Buffalo bound to New York harbor and Newark, N. J., having a driver, who was at that time complaining, and who soon became covered with small-pox. Sunday night, four days afterward, this man with small-pox was put off on the "berme" bank when the boat was near Bushnell's basin, east of Rochester.

Wandering onward until he reached Pittsford, the local authorities informed the State Board of Health, and after providing for the dangerously sick man, searched for the canal boat. The Secretary of the State Board, aided by the Superintendent of Public Works, found that the boat was near Utica; Health Officer, Dr. James G. Hunt, of that city, a member of this Board, acted on a general request of the secretary to arrest the boat and all its appurtenances, and place the same under the strictest sanitary regulations of that city. This was effected that night, and before business hours the subsequent morning the boat was towed into an isolated place, and kept under sanitary control until all sources of contagion were thoroughly disinfected and all persons on the craft vaccinated. The master and men of the barge made no secret of what had occurred. Their own statement of the facts is conclusively in evidence of the necessity for maintaining the efficient activity of the local boards of health, and their regulations for general vaccination, as well as a readiness at all times to deal with such danger as the barge Caroline had stealthily cast upon the berme bank of the Erie canal near Pittsford, and also transported in her floating cabin.

Numerous instances of prompt and successful action by local boards of health in the suppression of small-pox, and the public offering of vaccination will be presented in a subsequent section, and also in one of the appended records by the Secretary. That of latest date must here be referred to. It is important to the traveling public as well as to every community, and is briefly as follows:

On the 9th of November, as an express train (No. 8) from Cincinnati, Ohio, approached the Hornellsville station on the New York, Lake Erie and Western railroad, the Medical Inspector of Emigrant Trains (employed by this Board) was beckoned by the conductor of the express to enter one of the saloon cars. A passenger in an advanced stage of small-pox eruption was there found sitting unconcernedly. The instant stampede of the crowd of passengers was followed by seclusion and withdrawal of the infected car and passenger, and an immediate telegraphing, which secured speedy official instructions from the Secretary of the State Board, also a telegraphed request to the authorities at Elmira to hold the train until all exposed passengers and train men should be vaccinated at that station.

The events which ensued are not ended, at the time of this report, except as they relate to certain dead victims of the contagious poison in the car where the Cincinnati patient was found.

The sick traveler kept his seat in the abandoned railway coach a few hours until the pest refuge, two miles out of the village, was opened and prepared for him. He received ample care, but died November 24. The train attendant and fireman, Mr. Ray Robinson, at the railroad station, took fuel and water into the detached and quarantined car soon after the train moved toward Elmira. This

train attendant hastened away, yet only to be in turn a victim, twelve days later, and soon died of malignant small-pox. The car was sealed up and kept saturated with disinfecting gases until November 15, and as none who subsequently cleaned and renovated the upholstery, etc., suffered any harm, it was again, after a time, returned to service.

Next, after thirty-two days ensued a series of events which has not ended at the time this report is being written. A lady upwards of ninety years of age, who, in the exciting stampede from the infected car at Hornellsville, had hastily packed up her personal wraps and alighted from the train at Elmira about an hour after being transferred from the infected atmosphere of the sick passenger, behind whose seat in the car she sat. On the evening of the same day she arrived at the house of one of her younger sons in the town of Hector, Schuyler county, who, with his family, had been well vaccinated. Some days subsequently she went to the house of her eldest son, M. S. Compton, a man upwards of seventy-three years of age. What followed these several steps and stages by which the small-pox was traced continuously into the house of the eldest son will be recited in a subsequent statement in this report. Suffice it to say here, that he was attacked with hemorrhagic small-pox and died on the fourth day. His corpse was buried privately, and the people warned to take precautions against the contagion to which they had probably been exposed. The town board of health took prompt action; but as it was ascertained that probably a hundred persons and families in Hector and surrounding towns had been exposed to the dying man, the necessity for organizing effectually for general vaccination in the several towns was obvious. Therefore, the State Board immediately notified twelve town and village boards of health, and offered such aid as it could to extend systematic vaccination throughout all the school districts of the entire region as rapidly as possible. Though only recently organized, all of these town boards of health proceeded in their duties without delay and with entire harmony and success.

Tracing and hunting down the course of such a destructive contagion has become possible under the present system of local and general sanitary organization; and, as the instance of presumed transportation of the contagion from the arrested car at Hornellsville to a sequestered cottage in Hector, is the only escape of it yet discovered, we may hope no more like this will occur.*

The maintenance of a sanitary inspection of emigrant trains upon the two great railway trunk lines through the State, as mentioned in the second annual report, was undertaken, upon a reorganized and partially nationalized plan, and was steadily kept up until December 1. Dr. A. L. Perry, the inspector upon the N. Y. C. & H. R. R., maintained this service daily between Syracuse and Buffalo and Suspension Bridge; while Dr. J. H. Trumbull performed a like service daily, from June 1 to December 1, upon the N. Y., L. E. & W., and the N. Y., Pa. & Ohio, between Hornellsville and the western frontier of the State. During a part of the season the National Board of Health

* Since this report was made ready for the printer, it is ascertained that, of those exposed to the contagion by Mr. Compton, twenty-one have been attacked and seven have died, most of the cases being malignant and hæmorrhagic. Only one of the unvaccinated has escaped death, and that one a boy, twelve years of age, is horribly disfigured for life.

paid a certain sum monthly to those inspectors. The State Board covered the other portions of the period by *per diem* allowances. This service was continued until the requirements of the New York State quarantine establishments as well as those of the National Government, under a new law, came to be generally complied with upon the emigrant ships and at the European ports of departure. In the Health Officer's report, in a subsequent chapter, as chairman of the standing committee on quarantine, as well as in the statements appended by the Secretary concerning small-pox and vaccination, important records will be found relating to these subjects.

Typhus.— During the past summer this Board received repeated notices from the sanitary superintendent of New York city that Italian laborers from the West Shore R. R. lodgings, north of West Point, were being brought back to that city sick and dying with contagious typhus. Search was immediately made by local health officers and by expert medical inspectors sent by the State Board. It was found that several deaths, without suitable medical attendance, had occurred near Cornwall-on-the-Hudson, and that, in one instance, a coroner had held several inquests in a single crowded shanty lodging-place of the Italians. Though typho-malarial fever was the disease named in the verdicts, the sick who were found arriving in the city were suffering from true typhus. The shanty-lodgings of some six thousand laborers were rapidly inspected and sanitary regulations were established in them. The town boards of health took up the duty of continuing these inspections along the entire line, from Rockland to Onondaga county. The perilous crowding and filthiness of the gangs of laborers in their shanty-lodgings were breeding other diseases than typhus. Yet, as the latter had gained access to a few of the gangs, there is still a vigilant guard maintained against it. Its contagion still has a few hiding places in the city of New York, as described in last year's report.

Dysentery.—This disease, in a communicable or infectious form, was found to be prevailing at Knowlesville, in the town of Ridgeway, Orleans county. The President of this Board visited the place and conferred with the physicians, and as he coincided in their conclusions, all necessary hygienic precautions were adopted. A concise history of that epidemic, with a map of the field it invaded, and results of analysis of its well waters, will be found hereto appended.

Dysentery has prevailed in numerous other places during the year, but in no instance has its fatality in any degree equaled that which occurred in those districts of the city of Buffalo in the summer and autumn of 1881, where the inhabitants were at the time depending upon well-water for domestic uses; and it seems to be a notable fact that in far the greater number of instances of house and neighborhood epidemics of this dangerous malady, the defilement of the well-water is more frequently accused as the cause than all other circumstances together.

Other diarrhœal diseases.— The cities of New York, Albany, Troy, Schenectady and Buffalo, and not a few of the populous manufacturing villages suffer an excessive mortality from this class of diseases. Complex and various as the causes are, it seems to be true that as regards the young children, which perish by these diseases in the hot season, the greater numbers of them could be saved alive were they removed from the miasms which surround them, and domiciled wherever a pure atmosphere and pure milk would be supplied to them.

These little ones perish in places where older lives are comparatively secure. The sanitary resorts to which infants and children should be taken in the hot summer time are worthy all the study and expenditure given them.

Pulmonary consumption.— The first 7,000 records of deaths registered in the State Bureau of Vital Statistics show 856 accredited to tubercular phthisis of the lungs or "consumption." As these first registered were fair samples of records for the entire State, it may justly be presumed that these 856 deaths from pulmonary phthisis, which constitute 12¼ per cent of the consecutive total number, correctly express the proportion which this one cause bears to the total mortality from all causes and at all ages.

The avoidable and preventable causes of this greatest of the destroyers of human life must continue to receive the laborious investigation of sanitary and medical authorities, and it will not be counted strange or unworthy that, as recently has occurred, the most ardent of such investigators should express great joy and hope for the practical outcome of discoveries concerning causes and repression of the disease. It has been ascertained that in the very processes of education and provisions of schools and colleges the preventable causes of this disease are by various means invited and made fatally active; and that in many respects the habits and habitations, the industrial occupations, the modes and places of amusement, and even the places of public worship, and especially the court-rooms, and the various other places of public assemblage, for duty or other purposes, their vitiated air which is breathed and re-breathed, and the overheating and saturation of it have much to do in producing the tuberculous as well as acute diseases of the respiratory organs. It will be remembered that in the report last year the fact appeared that in many of the common school-houses, the pupils in their study and recitation-rooms had less than 100 cubic feet of air-space each, and that in some of the large city school-rooms the children were crowded at the rate of only 65 to 75 cubic feet for each. Such crowding and vitiation of school-rooms must be prevented, by school boards or local sanitary authority, even if a given school were to be divided in two sections each, separately on half-time attendance daily.

Whatever may be the undetermined causes of tuberculous consumption, the known causes are so well understood that most of them can be overcome or prevented; and it is worthy of repetition in every report upon them that the general and specific conditions of sanitary improvement of building sites and of dwellings, of neighborhoods and of districts, admit of those essential and common kinds of drainage and general sanitation which experience has proved to be effectual in extinguishing or repressing by some means yet to be fully explained by medical and sanitary science, some of the most generally fatal causes of pulmonary diseases, the chief of which is consumption.

The sanitary care of communicable diseases — contagious disease Refuges and temporary Hospitals.— The saving of the lives of the sick and the preventing of fatal contagion and infection from their maladies are now recognized in the amended general Health Act as sanitary duties of primary obligation in every community. Not only is it made

the duty of every board of health, "in all cases where sick persons cannot otherwise be provided for, to procure for them medical and other attendance and necessaries," but also, "to procure suitable places for the reception of persons and things infected with malignant, contagious or infectious diseases." These being obligatory duties of local boards of health, and the medical officers throughout the State being charged with the responsibility of administering this kind of service, the State Board has not hesitated to offer the assistance and information needed by the great number of newly-organized sanitary authorities in their plans and preparation for these duties.

The specific personal communication of disease by the sick and their excreta have at last been studied with such discrimination as to enable medical officers and family physicians to determine what special sanitary measures are necessary or justified for the prevention of disease as well as for the recovery of the sick, in each of the maladies now classified as contagious or infectious. There is, therefore, no good excuse for the medical or official failure so to discriminate and act as to limit to the very least extent the distribution and spreading of the infectious causes of disease. Yet in giving full effect to the necessary sanitary regulations to repress contagious maladies, the sanitary authorities find that two very serious obstacles confront them in what seem at this day to be errors of common opinion, to wit, that, on the one hand, only a limited proportion of the cases or outbreaks of the contagious and infectuous diseases, so-called, occur as the result of a specific contagion at all, as in scarlet fever for instance, and on the other hand, that by abundant exposure of the source of contagion, or the contagium itself in the open air, its harmful operation will be prevented and overcome by sheer dilution.

Whereas the sanitary precautions and enforced regulations of the local health authorities, as advised by the State Board, practically discredit the utility of such hypothetical conclusions, and require that, as effectually as practicable, the sick with these diseases be separated from other persons, and that all known sources of contagion or infection shall be disinfected; while the sick themselves shall enjoy every advantage that can come from the greatest possible dilution and removal of their own malignant emanations, and from the surrounding air, etc., of the sick chamber. The sanitary rules which are now coming into general operation for requiring the exclusion of school children from households suffering from diphtheria, scarlet fever and smallpox, and also prohibiting public funerals and other dangerous kinds of exposure of the dead before burial of the victims of these diseases, are based upon the same facts of medical experience and scientifically demonstrated truth as have induced this Board to offer to all medical and sanitary authorities and the people at large in the State, the necessary suggestions and the plans in much detail of specifications, for the prompt and effectual separation and domestic quarantine of the acute, contagious and infectious diseases. The published papers, known as numbers 13, 14, 15, 16, 38 and 41, and the illustrated circular, number 27, are devoted to this subject, and have been placed in suitable hands in every school district (outside of cities), in the State.

Not only is there a real necessity for preparation before hand, in each of the twenty-four cities of this State, of a contagious disease

refuge and hospital, wholly separated from all other hospitals, but there is need that at least the plans and authority be ready for the instant preparation and use of such refuges in the chief villages and minor centers of population; and, fortunately, it is true that already certain opulent towns in which there are such villages and large populations have given complete and successful examples in the establishment of these refuge hospitals. As this Board early directed the attention of all local boards of health to this subject, and required the Secretary to cause to be prepared and published for general use the most available plans and descriptions to facilitate the sanitary duties thus proposed, the response of local authorities is now an ample reward for all the study and labor given to this matter and to the rational management of all domestic quarantine regulations. The munificent and enlightened action by which the health department of the city of New York has just been authorized to expend $30,000 in the preparation of contagious disease refuge hospitals in the metropolis is worthy the advanced knowledge and resources by which the public health service in this State is being made instructive and useful to the entire country.

The pest-house of former times, being now superseded by sanitary refuges, the terror and mortal dread even of small-pox subside when the well-fitted temporary hospital of such refuges receives and provides for the sick and becomes the house of recovery, while disinfection and vaccination at once put an end to contagion and fear. This Board has found no serious opposition to the establishment of such regulations for pest refuges, with the hospital as the house of recovery, so far as relates to small-pox. Nor have the sanitary rules for domestic quarantine of diphtheria and scarlatina been much contested. All sanitary regulations and procedures are appreciated as soon as they are correctly understood, and all contention is terminated as soon as the good results of isolation, special sanitation of persons and premises and skilled nursing — as advised by the Board — are witnessed. The most enlightened classes see such results from the necessary official and medical interference amongst the needy or ignorant classes, that the methods and rules which produce a great saving of life in the latter are adopted in a voluntary way in the best private dwellings. The time is doubtless near, and, indeed, has already come in every city, when in any closely-built sanitary jurisdiction of 5,000 or more inhabitants, it will be found desirable, if not absolutely a public health duty, to have a contagious disease refuge and hospital ever in readiness or capable of instant organization and use. In each city this should be made an indispensable and permanent institution, and should have ample facilities of space and structures for at least three kinds of the acute contagious diseases which most endanger and alarm the community; while in the small village and rural township it may only be necessary to maintain the rules of domestic isolation and disinfection, and be ever ready to establish a refuge for more distant isolation of small-pox in a pavilion or a tent, which shall be every way adapted for the recovery of the sick as well as for the protection of the public. It has recently occurred that in the midst of great panic and danger from small-pox in a much exposed quarter of a populous village, the head of an affluent family, in his well-furnished dwelling, consented,

as advised by this Board, to accept the sequestered and airy refuge hut (of the kind shown in circular 27, of this Board's circulars, figure 1), he being in the first stage of confluent small-pox; and, after that little pavilion, which had been erected and furnished in a single night, had proved to be to him a house of recovery, he called for the account of cost for its construction, etc., and paid it as a just debt incurred in saving his life.

In the cities and largest of the villages the permanent sanitary refuges for saving from the most common and fatal contagious maladies will ere long be popular institutions for saving life and guarding the public health. The medical profession is already advocating their establishment. Said the president of the State Medical Society, a year ago: *"The large cities require a place, or places for the isolation and treatment of cases of scarlatina and diphtheria. Not only the tenement population, but the rich also, are in need of them." The obligatory duty of isolating and keeping under sanitary control all known sources of the contagia of pestilential disease will undoubtedly be publicly appreciated. It is a duty to be inculcated and judiciously enforced as an indispensable means of saving thousands of lives yearly.

Population and Vital Statistics of the State.

The 5,082,871 inhabitants enumerated in the census of 1880, increasing at the rate of more than one and one-half per cent annually, throughout the State in the aggregate, were found to be much more rapidly augmenting the populations in cities and the manufacturing villages than in the rural districts. This disproportionate growth of cities and villages, which seems to be a natural law of modern civilization and the development of mechanical industries and the facilities for amassing wealth, may long continue. The yearly tally of the increase of population in each city, village and town has become a matter of practical interest to each local jurisdiction and to the State government; and the time seems to have arrived when, as the Honorable Secretary of State (Mr. Bigelow) suggested in submitting the Census Report for 1875, concerning the products, etc., in each community, *a yearly record* is desirable and may be had, the gains and losses and general statistics of the population shall be accurately recorded by proper means within each local jurisdiction and at the Capitol of the State.

The State Bureau of Registration of Vital Statistics, as organized by the State Board of Health, under the statute which created this Board and defines its duties, has begun to demonstrate that such local as well as central records and registry are practicable and should soon be complete as regards every town, village and city in the Commonwealth. Though at first it was a matter of some doubt whether the Registration of vital statistics could be successfully organized and conducted throughout the State without the aid of specially trained registry officers, or, at least, without as liberal compensation as any

*See copy of resolution of State Medical Society of New York, February, 1883, on Special Hospitals for Contagious Diseases, in an appended chapter of Records and Evidence relating to these diseases.

other State or country has provided, this Board has begun the service of general registration, with such authority and provisions as the statutes offer.

The increase of population. — The natural increase by births and further augmentation of the population by immigration are believed to amount to nearly two hundred thousand each year in New York. Death takes away eighty thousand and upwards, and migration from the State removes many, so that the net increase of population is less than a hundred thousand, assuming as we may, the comparison of the ninth and tenth national censuses, for a basis of such general estimations. It is one of the first public results promised by a State system of registration and vital statistics, that the gains and losses in the population of the Commonwealth, and of each town, village and city in it shall be correctly recorded.

Deaths. — Each successive census enumerates and publishes certain total numbers of the dead in the census year, but the burial grounds, for the same period, show that from forty-five to one hundred per cent greater numbers have been buried than the census enumerators were able to report. This fact sufficiently demonstrates the difficulty that ever prevents correct general returns of vital statistics when not demanded and secured immediately after the events to which they relate. The actual number of deaths in the State, year by year, will now be correctly recorded. Already there is ample evidence that the total is not less than 100,000 yearly. This is too high a death-rate for a population of 5,200,000. But the city of New York alone loses about 38,000 annually, by death, and now has a death-rate equal to thirty and upwards in every 1,000 of its population. Such a death-rate for the entire State shows a loss of 160,000 yearly; but it is believed the actual death-rate for the State does not exceed twenty-one per 1,000. Urgent reasons placed in the Act for the Preservation of the Public Health a just requirement for a certified record of every death as a necessary condition precedent to a lawful burial. Such records are now faithfully made, and the untimely and excessive mortality are closely observed. The Board expects to be enabled to submit a complete record of the deaths which occur in the State in the year 1883.

The registry of marriages. — The laws having kept all branches of vital registry compactly grouped under our official head, the local boards of health, as well as the State Board, must deal wisely with that branch which relates to registry of marriage records, until these become as complete as those of birth and death. The law of nations, as well as of our several States, will undergo changes that are demanded by advancing civilization in regard to the universality and sanctity of the "Law of Marriage." The hygienic and the social circumstances of marriage as the lawful and honored covenant that should register the founding of the family sufficiently justify the enactments of the last three Legislatures by which the public health authority and the local recording officers are charged with the duties of enforcing and providing for the public registration of marriage. For the present such registry, under the supervision of the State Board of Health, seems to be a necessity of the public service, yet it must ultimately be provided for under laws that will require an attested record to be made

by the contracting couples as a public obligation precedent to any ceremonial or registry of marriage. The sanitary, judicial, social and ecclesiastical testimony in favor of such law and such a change in the method of procuring and attesting this class of records is now both harmonious and urgent. Wherever this class of vital records is received and registered, under an amended statute the practical uses of marriage registers will remain the same. Unlike the daily and monthly records of births, deaths, burials, and the prevalent diseases, the records of marriage are reviewed for hygienic purposes at the longer intervals of seasons and years ; yet these purposes, as well as the social legal objects of the registry, have to be made sure by the methods which physiological and judicial counsels devise. The persons who contract and enter upon matrimony should offer a perfect compliance with and attestation of these records, while the ecclesiastical or magisterial certification of the marriage ceremonial would be offered to perfect the public registry as the seal of honor attached to the records of the married couples. This view of the registration of marriage has now been so generally explained throughout the State that the necessary amendment of law to perfect this class of records would prove satisfactory to the people. It is plainly necessary that the personal records and identification of the individuals who enter upon matrimony should furnish to the office for civil registry, as well as to the ecclesiastical or the civil authority by whom the ceremonial is to be witnessed, an attested copy of such personal and identifying records of the twain. By this easy requirement the foundation of the family will have an honorable record, and every minister and magistrate who solemnizes the matrimonial ceremony will have a lawful warrant for attesting the validity of his act. Social order, morality and the demand of civilization obviously require that the public registry of marriage records shall be universally valid throughout all the States and Nations. The State which would establish a claim for such universal recognition of the validity of its registered marriages must secure in the primary records of every marriage a trustworthy attestation of the facts. Let magistrates and ministers continue to certify their ceremonial acts, but let the laws secure to them, and for the public registers, an attested record of the contracting persons.

Records of burials. — The laws relating to this subject, as enacted in 1880, 1881 and 1882, have resulted in committing to boards of health all the duties of regulating burials and the sanitary care of the dead. The State Board of Health remains responsible for preparing the proper forms and rules, while each local board frames and executes the necessary local regulations; and in case of absence, inactivity, or even great distance of the local sanitary authority, any justice of the peace may cause the lawful records to be filled out in proper forms, which, being by him attested, shall warrant him in granting a burial or transit permit. The possible inconvenience that was anticipated in large and sparsely inhabited towns has been entirely obviated by this available provision of the law.

The laws require that a certified record of a deceased person and the cause of death shall be the evidence upon which the burial or removal of the decedent shall be lawfully permitted. This is proved to be so just and reasonable a requirement, that objections and evasions seldom

occur. This Board being responsible, under the laws, for the preparation of the forms and general regulations for this service, it has given the instructions and sample forms needed by local authorities, and has placed sample certificates and other forms, with full instructions in the hands of each school district clerk in the towns. By these agencies, which have enlisted the best people in every community to act as local supporters of the registry laws, the proper sanitary regulation of burials and the burial places is being brought about, and various kinds of improprieties and hazardous practices relating to the exposure and movement of remains of the dead are interfered with in an official way. All public carriers, especially the railway and express companies, have satisfactorily complied with these new requirements of the public health laws. They all alike find that much time and embarrassment can be saved by strict compliance with these sanitary public regulations. The skeptical objections which for a brief period were made to the sanitary regulations against the exposure and public funeral of the dead from certain dangerous contagions have died away. Families, clergymen and public carriers of remains of the dead now very generally comply with these rules.

The local registration.— The effort to induce and effectually organize the local action promises entire success to the extent of the active existence of town and village boards of health. Perfect success in the registry service cannot be insured in towns and villages where the sanitary authorities are delinquent. Even the registration in the few cities which have not yet transferred the control of it to the sanitary authorities is defective and untrustworthy. In the cities of New York and Brooklyn, where for sixteen years and upward this branch of service has been controlled by the boards of health, the most perfect examples are presented in the records of mortality. Albany has, in the first few months' experience under its new health board, organized in accordance with the general health law, proved that the State regulations prevent the omissions and defects that inhered in the registry under municipal ordinances. As all towns and incorporated villages must maintain registration within their respective jurisdictions, or yield to the temporary assumption of that duty by the State Board of Health at their local cost, it now appears to be practicable to make the records and registry as complete and perfect in the towns as in the cities. The highest public uses of these records are realized when they are promptly and completely registered. They constitute the account current of human life in every community.

LOCAL BOARDS OF HEALTH — PRACTICAL OPERATION OF THE AMENDED LAWS RELATING TO THEM.

The general law for the preservation of the public health, which from 1850 to 1881 had authorized the creation and services of local boards of health in times of epidemics, or whenever the constituted civil authority deemed it necessary to organize such service. As originally enacted for the protection of the State against cholera, such a law for an occasional and temporary existence of local boards of health, was inadequate to meet the constant sanitary necessities of the people. The general law, as amended in 1881 and 1882, requires every

town, village and city to maintain its board of health in an uninterrupted existence and to require at its hands certain constant duties. The town clerk and a chosen citizen being united with the supervisor and the justices of the peace, constituting a town board of health, and in villages a smaller number of members being appointed by the board of trustees, from citizens not of their own corporation, to be the village health board; while cities have their boards constituted as variously as the structure of their respective charters, except as they have reorganized under the general health act, as have the cities of Albany, Cohoes, Ogdensburgh and Syracuse.

The general act confers powers and prescribes methods of procedure well adapted to secure the efficient and just operation of sanitary laws and regulations, and in no case that has been brought to the attention of this Board has there been a well-founded complaint of injustice or hardship by the parties upon whom a board's orders for compliance have been enforced. This success of the boards is in part attributable to the useful results of the "hearing" that is usually offered to the persons whose property or business interests are presumed to be affected by the operation of a sanitary order or regulation. The prudence as well as zeal and energy in the sanitary administration by these new local boards of health is most commendable.

As soon as town boards of health became numerous certain essential outlines and examples of procedure, in the local sanitary service, were presented by the State Board to every health officer and supervisor. That document, with appended specifications for the official supervision of contagious diseases, is known as No. 27 of this Board's papers, and it has become one of the most useful publications. The care of acute contagious diseases has been promptly and well learned by local boards and medical officers, who, in turn, have inculcated and applied a very practical code of sanitary rules and regulations. The demand for the circulars and other memoranda of information and sanitary advice, as published for local uses by the State Board, has resulted in the mailing, for such purposes, of nearly three hundred thousand compactly printed pages, which are now to be found in all the school districts and health offices in the State. The town and village boards of health have, with general success, induced the public school officers to require all attendants at school to be vaccinated and to regulate the exclusion of contagious diseases from the schools, as instructed by the State Board. In this endeavor of the local boards of health and the school officers, upwards of a hundred thousand pages of this Board's published rules and advice have been called for and distributed in the school districts of the towns.

The town health boards have succeeded in accommodating their supervision of the records of deaths and burials, as regards all rules for the same, under the laws, to the wants of communities, that only the members of the boards are put to inconvenience in providing the required burial permits based upon the certified records which the laws require. Seeing the necessity of making common compliance with the new requirements of law in this matter as easy and certain as possible, each board designates certain qualified members of its own body, besides the health officer, to receive or perfect the certificates of death and grant burial permits in cases needing nearer accommodation than the office of the Board can give. The uniform willingness

of local boards to do this and the ability of the people in most sparsely settled districts to comply with all regulations under these conditions, now promise entire success in the registry of mortality in every town. The interest and intelligence of the people have been successfully enlisted in this duty, though, at first, there were strenuous objections made, even throughout entire counties, because of the fear of local prejudices against a record of causes of death, the possible interference with funeral arrangements, or, in a few instances, the belief that such records and regulations would be attended by the imposition of fees or other kinds of cost. Patient explanation and a year's experience have removed these objections.

Village boards of health have no inconvenience in these duties, as a central and accessible office and representative of the Board are ever ready to receive the certificates and give information and any papers required. City boards of health provide for and enforce this class of duties in exact proportion to the efficiency of their general sanitary service.

In concluding this comment upon the local boards, it must be stated that the best experience shows that as regards the city and village health boards, they should be endowed with adequate authority and responsibility by the municipal authority which creates them to hold them without excuse for delinquencies and faults in the sanitary and registry duties. Also, that in regard to town boards of health, the health officer under each board, with such aid as the board may give him, should be required to make a sanitary inspection of the populous portions of the township, and of all its school-houses and places of public assemblage. To secure this result we submit a proposition, in a subsequent section, for requiring this duty to be systematically and well attended to under the rules which the State Board shall supply. Though a like sanitary duty is equally important in the cities and incorporated villages, their chartered rights and powers of local legislation and expenditures leave their boards of health and education respectively without excuse for any neglect or failure in such all-important service for the people. The common protection of the public health and family health requires such systematic sanitary inspection and oversight, and we believe the time has come to require it by law.

WORK OF THE BOARD ON APPEALS FROM CITIZENS AND LOCAL BOARDS, AND AS REQUIRED IN THE CASES REFERRED TO THE BOARD BY THE GOVERNOR.

Appeals and requests made to the State Board of Health, inclusive of those which come to this Board with an order from the Governor, are mainly of three classes:

(1.) Those which local boards of health or their officers make to the State Board directly.

(2.) Those which inhabitants of a locality make directly concerning any cause unfavorably affecting the public health.

(3.) Complaints, petitions or appeals which are sent to the Governor of the State, and by him transmitted with his instructions, or orders to the Board, for investigation and report.

In accordance with section six of the Organic Act, which defines the duties of this Board, it is peremptorily required that "they shall

make inquiries in respect to the causes of disease, and especially of epidemics, and investigate the sources of mortality, and the effects of localities, employments and other conditions upon the public health." Whenever the Governor of the State, however, requires this Board "to examine into nuisances, or questions affecting the security of life and health in any locality," the Board, in all instances, proceeds without delay, aided by whatever resources it needs to command and order or provide for; the Governor then takes action, or not, to enforce the execution of the duties or works recommended by the Board. The conclusions as well as the details of information which the Board transmits to the Governor are also given to the persons and parties whose duty it is to carry into effect the conclusions which have so been reached and reported officially. The actual improvements and benefits resulting from such investigations and conclusions are more frequently to be estimated by their influence in securing the voluntary performance of duties and execution of necessary work, than by any judicial action and constrained enforcement in regard to such obligations and work.

These works of the Board have thus far related chiefly to the following duties:

1. The necessary aid and advice to secure the organization and efficient working of local boards of health.
2. The preparation and issuing of necessary sanitary and official instruction.
3. The careful investigation of questions and complaints as submitted by local officials and other persons who seek such aid and counsel from the State Board.
4. The investigation of all matters of complaint, petitions, etc., as the Governor directs the Board to do.
5. The preparation of special reports, plans and specifications, by expert sanitary engineers and other skilled helpers employed for the purpose by the Board.
6. The continued examination and proper testing of existing laws relating to public health and the registry duties, and the study and preparation of improvements that are deemed necessary in the amendment of health laws and in the methods of sanitary administration.
7. The sanitary inspection and official advising in regard to public institutions, most notably the public schools.
8. The official oversight and instruction or advising in regard to the infectious fevers and diphtheria, small-pox (and its prevention by vaccination), the sanitary relations of foreign immigration, and the whole range of quarantine laws and methods, both external and internal.
9. Counsel and aid in the perfecting of local boards and their duties and the administration of the registration laws and the perfecting of the local registry by them.
10. The special investigation of endemics and epidemics and of the contagious prevalence of fatal diseases; the searching for local and other causes, and the reporting thereon, with sanitary maps and charts.
11. The beginning of investigation of the practical questions continually presented throughout the State, relating to sanitary drainage, sewerage and domestic hygiene, sanitary topography and malaria.

These topics continued to receive attention during the past year, and at the present time there is as much of all these branches of labor under treatment as it is convenient for the Board to deal with. Only in regard to the preparation of amendments of law, and the devising of forms and methods, is there any decrease of labor.

Thus far in a period of *twenty-eight months*, as shown in records of this Board, the separate works undertaken may be arranged as follows:

An investigation and conference with engineers and local authorities for drainage and sewerage, to abate the nuisance of the Hamburgh street and Main canals, etc., on petition of Buffalo city authorities. A topographical map and chart with complete reports by civil engineers, employed by that city, facilitated this duty and enabled the Board to co-operate successfully. That city has adopted a system of intercepting sewerage, to deliver itself and the Erie canal from a perilous nuisance.

The official entry and inspection of extensive premises, which a village board of health was forbidden to enter, which resulted in the immediate reporting to and local ordering by that board of an extensive sanitary reform of a popular water-side resort. In the annexed memorandum this is shown, and to it we can now add, that the proprietor has added to his first $10,000 expenditure on this reform nearly $10,000 more, and states that he has gained by that large expenditure.

Inspection of a water-side hotel and summer resort by a sanitary engineer and the committee. — June 28th the president of the board of health of ——— sent the following telegram: "Please, will the State Board of Health supply a sanitary engineer and inspector, to make an examination of the ——— hotel. Diphtheria has broken out." To this the following reply was sent: "Will call on you and the health officer, at the residence of the latter with a sanitary engineer, at 9:30 A. M., July 2.

(Signed) "———— ————, *Secretary.*"

At the appointed hour, the Secretary of the Board, accompanied by Mr. T. J. Nealis, sanitary engineer of the health department, New York city, met the president and health officer of the village, and proceeded to make a careful inspection of the hotel. The details of the inspection were duly recorded by the local board of health. It resulted in the following orders, made by the local Board before leaving the premises that evening after the formal statement by the sanitary engineer, of what would be required in each particular:

"Upon results of inspection by the local board of health of ———, and sanitary engineer Thomas J. Nealis, and the Secretary of the State Board of Health,

Resolved, That the proprietor of the ——— Hotel be directed to carry out the following precautions and repairs which are reported to this Board as essential for the protection of health:

1. To empty, disinfect and cleanse the receiving-vault in the basement at the head of main sewer, and the pipes discharging therein.
2. To remove all obstructions from sewers.
3. To ventilate receiving-vault by a six-inch pipe, carried above the highest point of the roof.
4. To have the flag-stone over the receiving-vault laid in cement.

5. To provide a trapped-sink in place of the open slop grating which discharges into receiving-vault.

6. To have the servants' water-closets in basement either wholly renewed, or placed and kept in proper sanitary condition. To disinfect and remove all filth from ground under seats.

7. To thoroughly disinfect, cleanse, and ventilate basement, removing the flooring and soaked wood-work around water-closets.

8. To place stench traps in waste-pipes directly under all untrapped fixtures, and to have all slip-joints made tight.

9. To have ice-boxes disconnected from sewers and made to discharge into trapped safes.

10. To have all openings from surface of basement into sewers effectually closed.

11. To effectually repair sewer from ice-house, and trap it so that no gas can escape into house.

12. To continue the soil pipe in each wing, at its full calibre, up to not less than two feet above the roof.

The execution of the work was commenced at eleven P. M., the same evening, and resumed at four A. M. on Monday following, continuing until the entire work was satisfactory.

The investigation of sources of a malarial epidemic in a highland village and valley upon petition of the inhabitants and by order of the Governor.— The invasion having been gradual, in two years became epidemic, and was not controllable by usual methods of drainage. The Governor's orders were directed to the railroad corporation that holds and occupies an embankment 3,500 feet long by twenty-six to thirty feet in height, that has turned a level bed of a river for three-quarters of a mile into a slimy pool and mud-bed, while a new channel has formed, leaving nearly one hundred acres of miasmatic grounds with muddy margins in a high and dry hill region. The railroad being controlled by a mere "construction company," the execution of work under the order is much delayed.

Investigations of outbreaks and limited districts of fatal prevalence of diphtheria were made by a standing committee and expert physicians in some twenty different towns and counties. Some of the natural laws of this destructive disease have been usefully studied, and a greater success has attended the Board's recommendation than was predicted. As the proprietor of a vast forest estate in Fulton and Hamilton counties, where diphtheria made its appearance as described in the Board's first annual report, recently informed a member of the Board, "the entire population upon the estate believed and acted upon rules which the Board had placed in every household, and they, and all others who witnessed the arrest of the malignant outbreak, believe they were saved by these means. Thousands of dollars, as well as many lives, were saved." This wilderness population of some eighty families, twenty-five miles distant from a physician, began to suffer as though a pestilence had come. In thirteen of the best of the dwellings, with forty-five children, there were forty-three cases and ten deaths before the absolute rules of sanitary control and nursing were adopted. The two physicians nearest the population gave themselves to duties advised and provided for by this Board and the resident agent of the estate gave material aid.

Investigations into the local causes of fatal endemics of dysentery

and of enteric fever have been made in some twenty places. The fatal effects of polluted water, and of rapidly putrifying vegetable matters about dwelling-houses, or upon the margins of stagnant ponds and mud-flats, are the more frequent local causes ; while crowding of lodgers in unhealthful quarters and upon miasmatic grounds, and in a few instances, the introduction of a first case of one or the other of these maladies, are plainly shown to be preventable causes. Local authorities have been incited to the necessary efforts and have made sanitary inspections from lodging to lodging.

The methods of watchfulness against outbreaks of small-pox have resulted in the use of the telegraph as well as the mails for notification to, and advice by, the State Board. In the eighteen months ending December, 1882, there were one hundred and sixty such notifications to the central office of the Board. The promptness of advice and action thus secured has kept that contagious pest under control. An official notification to each of the school districts in the State, as provided in circulars 38 and 41, has induced general compliance with the vaccination law and the Board's instructions. Thus the entire State has been brought under a degree of sanitary protection never before experienced in its history, as regards small-pox and vaccination.

To make sure of timely and adequate sanitary measures to arrest the progress of infectious diseases, the Board has caused plans and estimates to be so prepared and distributed, that the local board of health in each town, village and city shall have in hand the working plans for contagious disease refuges and temporary hospitals. (See circulars 27, A and B.) These circulars describe the best methods of procedure and are published and distributed as a manual for daily use of local sanitary authorities.

The organization of the local boards of health and the discriminating and enlightened concern regarding the preventable causes of sickness, and other harm to health, have resulted in opening an incessant line of questions and answers, and appeals for counsel and direction, which already constitute an important daily service at the central office of this Board. In subsequent sections of this report and the chapters appended hereto, the nature of these relations between the people and the State Board of Health is unfolded.

PROCEDURES UNDER SECTION EIGHTH, STATE BOARD OF HEALTH LAW.

The executive resources of the law creating the State Board of Health are centralized in its eighth section, and as amended in 1882, by chapter 308, the power of the Governor of the State to cause the execution of his orders upon the findings or conclusions of this Board are ample. The few orders of the Governor that have been issued upon the basis of this law, before its amendment, have not failed of execution, except in two instances, where the work required was delayed, to the public detriment. Successful procedures for the execution of the orders in these two exceptional localities were instituted after the amendment of this section 8, by chapter 308, Laws of 1882.

Upon appeals and petitions made directly to the Governor of the State in accordance with the provisions under section 8 of the State Board of Health law, there have been referred to this Board by

the Executive twenty-eight cases requiring investigation and report. All these have received prompt attention, and the Board's reports and conclusions thereon have in most instances been the means of securing the local improvements required, or the removal and prevention of the nuisances complained of. In a few instances it has been necessary to recommend that executive orders be issued to accomplish the required result. Such orders have been given by the Governor in the counties of Rensselaer, Kings, Queens, Westchester, Livingston, Chemung and Schuyler.

The first order by the Governor, upon results of investigation by the Board relates to the abatement of stagnant pools in Schaghticoke. The second order was upon nuisances at Hunter's Point, complained of by residents of New York, and chiefly relates to offensive products of petroleum. The nature of the nuisances and the results of the Executive orders are described in a chapter appended to this report and in an appendix to the Second Annual Report.

One of the most important of the Governor's orders relates to the drainage of the prism, or bed, of the late Genesee Valley canal, through a distance of some thirty miles, by the railroad company which had acquired the property from the State by purchase. The work required, and as originally advised by this Board, constitutes an essential part of a general plan and necessity for draining the swampy bottom of the canal, as brought to the attention of the Legislature in 1881. The canal property which remained in the State's possession on that line was already brought under thorough drainage by means of the appropriation which that Legislature made for the purpose. The Superintendent of Public Works successfully executed the work required on the latter portion, namely, that extending from Dansville to Kishaqua creek in Groveland, near Mt. Morris, and from that point northward to Scottsville, Monroe county, the Governor's order was enforced upon the railroad corporation. The requirements and plans for the latter section of the work will be seen in the report of the standing committee on drainage, sewerage and topography in the paper marked "A."

The successful execution of the work is a matter of congratulation; for miasmatic diseases became more and more prevalent during the three summers this section of an abandoned canal had been left to become a pernicious swamp and malarial bed.

This Board supplied all the aid in its power to prepare the engineering scheme of this work, as the appended report just referred to will testify. It also maintained a medical inspection, to secure whatever such observations and the experience of the people should furnish. Papers giving certain testimony relating to this subject will be found in the appended reports relating to diseases.

The delay to meet the responsibility in regard to the Governor's order upon a nuisance caused by a brewery in New Rochelle village has issued in the voluntary closure of the brewery.

The orders of the Governor upon the sources of nuisance at Schaghticoke were renewed under the provisions of the amended law, and have resulted in the voluntary undertaking of the difficult task of removing evils which had been thirty years progressing to culmination in a perpetual epidemic of miasmatic fevers. An appended report on this epidemic, as it appeared in the spring and early summer of 1882, shows

that nearly one-half of the entire population was sick, and that business interests were jeoparded by that sickness. The diagrams and descriptions given in the committee's report show what natural difficulties are confronted in any attempt to drain and dry so extensive a *cul de sac*, or to convert, either into a running stream or into dry ground, such a tortuous stagnant channel as that of the abandoned bed of the river.

This important case illustrates various difficulties met with in applying lawful remedies to overcome evils where several causes contribute to them. In this instance the deflection of a river from its original channel through an alluvial flat occurred beyond the limits of the village that now suffers, and in part beyond the limits of the town in which the village is situated. After many years the channel became a festering pool, without motion, excepting when flooded by back-water from a point three-quarters of a mile below the beginning of the embankment by which the river had been wholly turned into its present or south channel.

The first evidence of the unhealthfulness of the locality was in the nature of a very fatal and persistent epidemic of diphtheria from 1876 to 1878. The next evidence was in the increase of miasmatic fevers, from a few cases in 1878 to a continued epidemic in 1880, and its persistence in 1881 and 1882. It is not presumed that this kind of sickness will disappear spontaneously, and it is to be hoped that, after the improvements now ordered are completed, the people of the village near by may cease to be afflicted with sickness that they have no power to prevent.

The sewerage and drainage questions which were submitted to this Board by the authorities of the city of Hudson were found to be vastly more important than that intimately associated with the "South Bay nuisance," of which many people in that city had complained heretofore. It was ascertained that the sewage of an extensive district had its outflow into the South bay, which at low tide is a vast mud-flat, extending over 100 acres or more. Further, that the southern slope of that city was not only insufficiently drained, but spills out its sewage and drainage in a bad way at the foot of the slope toward the South bay. The report by the Board's committee explains this matter and shows what the present want of sewerage in city of Hudson is.

The city of Yonkers appealed to this Board, first, through a body of its citizens, as shown in the first annual report, and more recently by personal petitions and an appeal by the municipal board of health directly to the Governor to require this Board's intervention to prevent the great evils which are familiarly known in that city as the "Nepperhan nuisance." The Board, in August last, renewed its examination, and, after careful inspection, with the aid of an expert engineer, and after a public hearing of complainants and the various manufacturers and contributors to the nuisance, reported to the Governor the conclusions then reached. They are found appended in this volume.

It appears that the delinquency of the legislative branch of the city government, as well as of certain executive departments of it, have become a reproach to the city, and that no reform and prevention of the causes of defilement of the Nepperhan river, upon which extensive

manufacturing interests are located, can be expected under the lax municipal government. The Governor found no way in which his authority could be interposed to enforce sanitary duties. The report and map submitted to the Governor will be examined with interest in a chapter hereto appended.

Other cases of complaint and petition have been referred to the Board by the Governor; but in all instances the conclusions or advice given by the Board to the individuals and officials concerned have sufficed to secure the improvements desired.

Certain sources of miasmatic fevers complained of at Fairport, in the town of Perrinton, Monroe county, have been repeatedly and justly complained of. In this instance the obstructions upon the headwaters of the Irondequoit which flows through that village must be prevented, and in this duty the New York Central railroad has the first responsibility. The people of the village and town also have their share, and they are proceeding with their part of the duty. In this instance, fortunately, the railroad company will contribute its part. But besides this, there is an extensive nuisance caused by the stagnant pools in the bed of the old canal, which was abandoned under the "State Improvements" in 1857. The inhabitants justly appealed to the State to overcome that nuisance, for which it was responsible. An appended report shows what these evils respectively arise from.

In some cases the subject of petitions and report did not admit of an immediate settlement of the questions at issue.

In three instances the attention of this Board has been urgently called to an alleged source of sickness and mortality, caused by the accumulation of vast masses of saw-dust and mill-wastes in the near vicinity of dwellings, and in the case at Ford Edward the evidence of the nature, extent and results of this evil has been carefully examined, and in the opinion of this Board is deemed worthy of the application of a sufficiently comprehensive remedy in the nature of a statute for preventing the accumulation of such mill-wastes, as may at any time, and in any place, be properly applied to restrain persons and mills that are responsible for such causes of complaint.

The fact is that saw-dust-waste, and a great variety of other mill-wastes, consisting largely of albuminous, starchy, and glutinous substances in animal or vegetable matters, which enter upon the process of decomposition whenever accumulated in the presence of moisture and warmth, become dangerous to life and health, from the various conditions which now begin to be scientifically understood as the very sources in which the unseen or microscopic oganisms that produce the phenomena of decomposition and putrescence are bred and diffused, in such ways as now are charged with having some leading part in spreading and aggravating fatal diseases, and even in producing them.

Leaving all theories on this subject aside, rotten or decomposing vegetable matter, in the presence of moisture and warmth, may be justly accused of vastly more evil than has been charged to this class of causes of fatal fevers and blood-poisons. For these reasons, the accumulations of such waste matters should be prevented, and all local boards of health should find at hand some available law which, under judicious and responsible central advice and direction of State authority, they can apply, and with the central authority can make effectual throughout the whole extent of any water-course or water-side.

The State Engineer and Surveyor, together with the State Board of Health, should be empowered, and they may be found competent, it is hoped, to guide the needed application of such law.

The daily requests at this Board's central office for advice and direction in regard to local evils and complicated or unsettled questions in local sanitary administration have finally made it necessary to institute a systematic study of the sanitary topography and other special conditions characteristic of the populous towns and villages in this State. The few experienced civil engineers who from time to time have served this Board are frequently employed in these duties. The best experience also in local sanitary government becomes doubly useful in aiding the Board to give the advice and information called for, and as the special application of particular provisions of the health laws has been under review in a great variety of cases, it is found that there will be needed a more specific and well-defined authority to deal with certain evils that menace the health of towns and villages.

SANITARY DRAINAGE OF SWAMPY BEDS OF ABANDONED CANALS.

As noticed in its first and second annual reports, definite accusations of swampy conditions of recently-abandoned beds of certain recent canals of the State were presented to the attention of the Board, and subsequent petitions to the Governor brought these more prominently under review. Investigation fully confirmed the correctness of the medical opinion and common belief, that extensive lengths of these old canal prisms had become miasmatic, and that the sickness complained of was even more general and threatening than the complainants had represented.

The first report made to the Governor on this subject, by officers of this Board, related to the canal extending from the Chemung river northward to Seneca lake, which, upon each of its successive levels between its forty-four locks, had become a miasmatic breeding-bed; while from the forty-fourth lock, southward to an obstructing dam at the village of Horseheads, was an extended and entirely stagnant pond with mud margins.

The dam here mentioned had been authorized by a special enactment of the Legislature in 1879, on request of the people of Horseheads. Throughout the most populous portion of the entire valley here described more than one-half of the inhabitants had suffered from disabling malarial sickness for the two successive years. The report above referred to was made, after personal inspection by the President and Secretary, in a single paragraph, as follows:

"That they have made personal inspection of the places complained of and taken the testimony of physicians who have care of the people in the neighborhood. The amount of sickness is appalling, no family escaping the invasion of malarial diseases for a distance of two miles along the borders of the old canal, even children at breast becoming purple and shaking with the cold stage of intermittent. We find the prism of the abandoned canal has become a marsh. But we believe the whole danger can be removed by simply ditching, with a little filling at special points. We advise, if such work is undertaken, that the ditches be so protected at the sides as to become durable."

Dated *May* 30, 1881.

(*Signed* by President and Secretary of the Board.)

The Legislature, upon receiving this report from the Governor, immediately voted what was considered adequate to enable the Superintendent of Public Works to execute the drainage recommended as above. At the same time local boards of health and other citizens, in the towns between Dansville and Caledonia, in Genesee county, were calling for official advice and aid to overcome and prevent a similar source of miasmatic sickness, which gave them great anxiety.

While this brief report was being considered by the Legislature, the sanitary inspection of the nuisance complained of in the canal prism between Mt. Morris and Dansville was being completed, and, at the Governor's suggestion, the bill to provide for the drainage required in Chemung and Schuyler counties, as here described, was so amended as to meet the requirements for drainage of that portion of the abandoned Genesee Valley canal not yet sold to corporations and citizens; namely, the section known as the Dansville branch of the Genesee Valley canal.

Six thousand dollars were appropriated for this work under chapter 593 of 1881. The week after this law passed, the work was begun in the town of Veteran, Chemung county, at lock No. 27, and was pushed both northward and southward by a large force of laborers and teams until the 6th of August, when the drainage works were ended for the season, though not completed, as no further disturbance of the wet grounds was deemed justifiable in the dry, hot weather of the late summer and early autumn. Besides this, a considerable amount of filling and grading of certain portions of the canal bottom had before this been completed as being essential to drainage. The greater part of the drainage in that section of the canal, in three towns of the counties of Chemung and Schuyler, was, however, already completed.

At the same time the work was being pushed forward between the junction of the main stem of the old Genesee Valley canal and Dansville, on the branch leading to that village, a distance of some fifteen miles. The same reason prevailed as in the Chemung and Schuyler county drainage to terminate the work in the hot period of the early autumn, and to wait completion in 1882.

The results reported in September, October and November, 1881, along the canal beds thus far drained were exceedingly favorable, and as regards the entire course of the canal from Havana to lock No. 34 near Pine Valley, upon the southern border of the town of Veteran, malarial fever disappeared completely during the first week in September, and has not since reappeared, excepting in the very few cases which are alluded to by Hon. Dr. Beard in his report as hereto appended.

In the Genesee Valley, along the Dansville branch, similar, but not as complete, sanitary results ensued, as will be seen by the report of Dr. Ames, hereto appended.

In the spring of 1882 the drainage was recommenced, and has been completed upon both these extended lines of abandoned canal. The results have been made more conclusively favorable to the immediate or early value of such drainage than any one had predicted. The final report by Dr. Ames, upon the Genesee Valley drainage, is certainly satisfactory; and that by Hon. Dr. Beard is exceedingly exact and statistically conclusive, for he shows that in 1881 there were, between

the 1st of June and November, 242 cases of malarial fever between Pine Valley bridge and Havana, a distance of six and one-half miles, while in 1882, during the corresponding period, there were only forty-one cases, forty of which were in a limited malarial spot near Pine Valley bridge. In other words, miasmatic diseases had practically disappeared excepting at a filthy and unhealthy spot near the Pine Valley "creamery."

Further south to within about two miles of Horseheads village the drainage was effectually completed during the past season. The Horseheads drainage will have to be provided for by concession of the people of that village who successfully appealed to the Legislature in 1879 to have a stagnant pond preserved by damming up the old canal bed at a point north of the village, and at its southern boundary also, thus preventing drainage through the natural channel southward into the Chemung river.

There now remains in the State treasury to the credit of the authorized drainage work by the State out of the $6,000 appropriated, $1,221.08, a sum quite sufficient, it is believed, to complete the drainage that may be necessary in preventing the outflow from the summit level of swamp land between Horseheads and the point northward where the drainage works terminated last summer. The completion of this extensive ditching and culverting work in a thorough manner, as first proposed by officers of this Board and provided for by the Legislature, has quite conclusively proved that the sanitary requisitions which the State Board of Health makes upon the Department of Public Works can be executed with decided advantage in economy, and with beneficial results which no one can dispute.

The drainage is now complete to a point of more than a mile south from lock and level No. 44, or to the summit divide of the water-shed between the Chemung and Susquehanna and the Catherine creek and Lake Ontario.

FINANCIAL STATEMENT. EXPENDITURES BY THE BOARD.

As required by the eleventh section of the law creating this Board, a detailed statement, made by the executive and finance committee, is appended, which shows for the fiscal year ending September 30, a total expenditure of $12,934.60, classified as follows:

Postage and expressage	$576 00
Printing and stationery	1,201 78
Scientific and expert services	2,728 57
Salaries and wages	7,472 12
Traveling and other necessary expenses of members of the Board, while on duty	843 21
Library	9 50
Miscellaneous expenses at central office	86 92
Furniture	16 50

The finance committee has estimated that the Board should have subject to its order, for necessary uses during the fiscal year beginning October 1, at least $20,000, so greatly has the Board's work

extended, and the necessity for special service by scientific and skilled persons increased. Several such employed persons are on duty in some part of the State every week. The total amount that can be expended yearly in this way is limited to $5,000; yet much more of such work than that amount would pay for may be desirable. The members of the Board perform as much of such labor as they can, the doing of which will necessarily incur traveling expenses. The meetings of the Board required by law to be made at least quarterly, are actually held at much more frequent intervals.

The service incident to a more complete organization of work in the State Bureau of Registration and Vital Statistics has increased the clerical and printing expenditures. Whatever can be saved out of the total sum asked for, the Comptroller will keep to the credit of the Board for the subsequent year; and that officer guards our finances, and facilitates the Board's effort to economize and properly use the funds that are accredited to the Board's account.

Law to Prevent the Adulteration of Food and Drugs (Chapter 407, Laws of 1881).

Under the operation of this law the Board has endeavored to lay a foundation of correct knowledge which shall enable all local boards of health and any citizens who have reason, to take action for repressing and preventing the adulteration of food and drugs and the sale and use of the same, to aid in this sanitary work. The considerable amount and variety of information presented on this subject in the Board's second annual report shows that the field for operation of this law is even more important than was known to the Legislature that enacted it. Difficult as this field is for the administration of adequate sanitary regulations, and largely as it partakes of the nature of sanitary police duties in which the observation and restraint depend upon the kinds of chemical and microscopical examination required, this Board has not attempted to excuse itself from the duty imposed by the Legislature, to supervise and give as full effect as possible to the operation of the law.

Perhaps the most important outcome of all the investigations thus far pursued under this law is that which will most concern the people when it comes into full effect for repressing and preventing wrongs. It is in certain common articles of food, and accessories of food universally in use, that there must be a relentless demand for the total arrest and prevention of the frauds and deception which are practiced in respect of those substances. The report of the standing committee which has charge of chemical investigations, under its chairman, Prof. Chas. F. Chandler, hereto appended, and the extended papers submitted by that committee and in part published in the second annual report, present the details which readers will desire concerning this matter. Suffice it here to say that milk, the most essential and permanently important element of human food which is liable to harm in the public marketing of it, is undoubtedly the most adulterated and injured of all food-articles; and as more than half the entire population in this State dwells in cities, and as it is believed that nearly two-thirds of all infants and children in the State depend upon milk

daily purchased at the door or in the market places, such adulteration and tampering with vital food-elements of infancy and childhood is in its very nature a crime, against which the sanitary authorities of every grade in the State and all citizens should set themselves in earnest opposition, until pure and wholesome milk only shall be offered, whatever the method of its marketing and sale. In view of the practical importance of this subject, the Board has taken decided action to aid and advise local authorities of cities and villages in a legitimate warfare upon this crime, and against this wrong to families and their little ones.

The class of substances next in order of frequency and of harmful adulteration and fraudulent substitutions comprises accessories of food which the habit of the people, and what are considered necessities of the ordinary cuisine, among all classes of people, have made essential to the common diet, or necessary in the preparation of bread-foods, etc. Among these substances are the baking powders, such as cream of tartar, acid phosphates and other materials of admixture in aerating powders; the appetizing condiments and aids to digestion, such as mustard, pepper and spices. Perhaps the most important of all, are the adulterated stuffs which are sold under the names of coffee and tea. What actually are found to be constituents of these various substances as palmed off and huckstered in the markets to a very harmful extent throughout the State, will be examined with interest in the committee's report before referred to.

The simple fact appears, that the first cases brought into court to suffer the penalties imposed, even in the lower jurisdictions, which have cognizance of offenses against the Food and Drug Adulteration Act, were instances of dangerous substitutions and frauds, such as the sale of cream of tartar (*bitartrate of potash*) containing ninety-five parts of common *gypsum* or *terra alba* combined with five parts of *tartaric acid*, certainly a harmful irritating compound to enter into any article of food. In like manner the mustard, the coffee in packages, various delicate spices in tempting packets and covers, were found to be, as described in the committee's report here mentioned, "unfit for the human stomach and utterly fraudulent as accessories to food and diet."

Fortunately in a land overflowing with bread-stuffs, excellent in quality, and cheap in price, staple articles of food — milk in certain of the cities and large villages excepted — are so moderate in price that there can be but little temptation at present to deteriorate their quality by any kind of adulteration.

The adulteration and deterioration of drugs are evils associated with the commerce in these articles. The harms resulting therefrom are deplorable, for they endanger life, and may, and do it is believed, disappoint all reasonable hopes and promises of medical attendants upon the sick in dangerous diseases in which it is necessary to have the perfect therapeutical attributes of every article of the *materia medica* which is called for in the medical service. The most valued and precious of all lives in the family and the State may be put in jeopardy (and alas! have frequently been put in jeopardy), by the fault and failure of articles used in medicine after their deterioration or adulteration. The laws relating to the prevention of such evils in the drug

market and in the prescription business of apothecaries are, therefore, just and right, and will need to be administered with fearless and faithful regard to the lives and health of the people.

Chapter 407 of the Laws of 1881, known as the "law to prevent the adulteration of food and drugs," was enacted as an experiment in a necessary branch of the service which no other State in the Union had yet tested. The law is based upon a report and a project for an act prepared by a learned commission that was engaged by appointment from the United States Board of Trade with the design to protect and, if possible, induce honesty in commerce of food-articles and drugs. The duties under this act impose an unsought and very onerous responsibility upon the State Board of Health. It has been the constant and urgent endeavor of the Board so to administer this law and set it in motion that its highest capability for public usefulness shall be secured, while at the same time no embarrassment or harm shall result to trade or to the necessities of the people.

The Law to Regulate the Standard of Illuminating Oils and Fluids for the Better Protection of Life and Health and Property (Chapter 292, Laws of 1882).

The terrible results of explosion of the naphthous vapors given off from petroleum and other illuminating fluids had come to be a subject of legislative interference in nearly half the States in the Union before the necessity for such an enactment was much agitated in the Legislature of this State. The law above entitled, as passed on the 6th of June last for the State of New York, is one of the simplest and most readily complied with of any of the existing American statutes relating to this matter.

The flashing test by which naphthous vapor is evolved from an illuminating fluid is quickly discovered when at a temperature of 100° Fahr. a jet of flame is brought in contact with it. This test is all that the law has required, except so far as relates to oils that must be of still higher security against the presence of such vapor, where the oil itself must not ignite at any temperature lower than 300° Fahr. This latter test is required for protection of railway and other steam carriages; and there is no reason to believe that the operation of the law under either, will cause any injustice or hardship to those who manufacture, use, or deal in kerosene and other illuminating oils.

An important and instructive statement concerning the operation of this law during the past few months will be found appended hereto. The statement shows that, in numerous large villages and in at least two cities, a great proportion of the samples of kerosene purchased for the State, during the past autumn, were proved to be below the standard required by law, and that some of the samples were found to give off explosive naphthous vapor at the ordinary temperature of the family apartments and work-shops in which such lights are used. In several cases of fatal burning from explosions of these dangerous illuminating fluids, the Board has caused to be instituted the necessary procedures for the conviction and penalties required in such cases. As the law makes it "the duty of all district attorneys of the counties in this State to represent and prosecute, in behalf of the people within their respective counties, all cases of offenses arising under

the provisions of this act, these prosecuting officers have, whenever this Board has requested, proceeded to bring the cases before courts of competent jurisdiction.

While it remains to be seen whether the existing law is sufficiently exacting or strong enough to repress and prevent unlawful practices defined in the act as dangerous to life, health and property, it is safe to say that the general effect of the act has beneficially awakened the interest of the people, dealers and manufacturers alike in regard to the duty, whatever means may be necessary, to prevent the kerosene horrors.

School Hygiene. — Progress of Efforts to Promote Health in the Schools.

Early in the second year of this Board's work it became a duty to answer various practical questions asked by school officers and teachers concerning health in the public schools. The fact that the most destructive contagious diseases of children, namely, diphtheria and scarlet fever, induced such inquiry, indicated the willingness of the people to do something to prevent the common school from furnishing the means and place through which such contagions fatally spread.

In order to accomplish any good thing effectually, means must be adapted to the end, and inquiries and statistics must be upon a sufficiently comprehensive basis; consequently, the mode of investigation into the sanitary condition and wants of school-houses was deliberately planned, as set forth in the Board's second annual report, and in its published chapter of certain results attained in the beginning of school inspection, as published in paper No. 43 of the Board's current series.

So much space was occupied with the subject in the last annual report, that it is not expedient in this, the next succeeding report, to add much upon this subject. Suffice it here to state that the voluntary undertaking of exact and complete investigations by local school boards, and particularly by health officers and some of the superintendents and commissioners of schools have been going on steadily and with increasingly important results in every county in the State since the last year's report was completed. Examples of these reports separately appear in the appended papers from the standing committee on public institutions.

The following points in this experience of the Board's intrusion of sanitary questions and sanitary duties into all the public schools of the State may be concisely enumerated:

(1.) School officers, parents, and the public press have, without a single known exception, encouraged and repeated this mode and plan of offering sanitary advice and formulating certain essential sanitary rules for health in the schools.

(2.) Certain most necessary regulations and advice for the prevention of the occurrence and spread of contagious maladies among school children have been called for and presented in all the school districts of the State; and in the reports now and for some months past being received from school district officers and local boards of health, it is shown that the sanitary rules and advice given in the Board's papers, Nos. 38, 41 and 43, are generally and cheerfully followed.

(3.) The willingness to obey, and the good results ensuing upon the official notification to require compliance with the statute relating to vaccination of attendants at the public schools, have been thus far without exception, and compliance is now officially enforced without difficulty. The official approval of a published statement by the Superintendent of Public Instruction upon this subject, in January, 1882, continues to have an excellent influence with teachers and school officers. The papers here mentioned will be found in the appendix to this report.

(4.) The structural improvement for sanitary purposes, chiefly in old school buildings, are numerous, and they begin to give proof of their utility.

(5.) The increasing and widely extended interest in regard to health in schools is resulting advantageously in the provision for sanitary wants in many of the school buildings now in progress of construction or under orders for building. The example presented in the plans of the new school building in Auburn, now being finished, is included in the committee's report as an illustration of results that are sought in this Board's action concerning school hygiene. The reports from Auburn, Elmira, and other places, as given in the appendix, will also be examined with advantage.

(6.) Overcrowding of school-rooms is an evil equaled only by its concomitant, the lack of ventilation. Defilement, amounting to poisoning of the atmosphere of a vast proportion of the school-rooms, especially in the populous villages and cities, is a wrong which, at the mildest, this Board denounces as homicidal. These evils can be prevented, and they must be; if not by an enlightened and reasonable school board and the people, they necessarily become public health questions and must in some manner be understandingly and successfully met. Already in some of these overcrowded schools experience has proved that a school for young children may be successfully divided and conducted on the half-time principle, one equal section having the school-room for the morning hours, the other equal section having it during the afternoon hours; but such a dernier resort is to be recommended only to save health and life in families which trust their children to the public schools.

(7.) There is ascertained to be an imperative necessity for the thorough instruction and indoctrination of school teachers in the plain natural laws relating to hygiene, and in a practical knowledge of human physiology, which should be tested by examination before any certificate or license to teach is given the public school teacher.

(8.) The duty of the local civil government in every community of families, and of the State itself, to require that all school-rooms and school-building sites shall be examined and approved by competent sanitary authority, is a fact conceded by the most intelligent of our public school teachers and most experienced school officers. For the present this Board is urgently advising and securing such inspection wherever it can be made accessible and practicable. In all cities this duty of sanitary watchfulness over the school-rooms and all that concerns health in education certainly is worthy to be specially ordered and provided for in the scheme of public education and public health care.

The measureless human interests centered in the school-room, where upwards of a million children and youth are daily assembled, should need no other plea than these statements concerning them.

MALARIAL AND MIASMATIC DISEASES.

The localities of paludal malaria the extent to which miasmatic diseases prevail cannot be ascertained from records of death, but from reports of sickness, yet the total mortality from the miasmatic fevers and other kinds of disease from the same class of causes is considerable. The special sources of these diseases abound in the large cities as well as in the regions of drying swamps and stagnant ponds or undrained basins and water-soaked grounds. The local suffering from malaria is often found to exceed even that which, from other causes, is attended by great mortality. In some instances the increase and persistence of malaria breaks down the health of many families, discourages enterprise, and drives the thrifty classes and their business to more healthful localities. The villages and hamlets that suffer thus, in this State, present some very conclusive illustrations of the disastrous losses caused by a local source of sickness when unremoved. The cities which suffer most live by their commerce and trades, and as their inhabitants cannot thus be driven away to more healthful places the sources of malaria and other miasms in the larger cities exert a vast influence upon the public health and total mortality. The share which the malarial causes actually have in the nearly sixty thousand deaths yearly in the metropolitan district alone will not be correctly known nor sufficiently appreciated until the sources of malaria there are controlled.

It is to the debilitating sickness and its pernicious results, rather than to the number of deaths that the local sanitary advisers point in all their reports of malarial diseases. Practical illustrations of the significance and importance of sanitary and statistical investigations of the local sources and results of malarial diseases are given in a chapter appended to this report. The instances at Fairport, Monroe county, and at Schaghticoke, Rensselaer county, are conspicuously noticeable; for in the former place, in the midst of the dry and healthful drift-ridges, the thirteen families whose dwellings were nearest the stagnant and drying creeks in the valley where the Irondequoit rivulet has its head, had, at the time of a recent sanitary census, forty-two cases of malarial sickness in a total of their fifty-nine inmates; while in the village of Schaghticoke, in the midst of highlands and upon a narrow promontory of rock and gravel around which the Hoosick river coursed in rock-bottomed channels, and from the upper incurvature of that one nearest the eastern margin of the promontory, the river has been wholly turned away to the left, leaving some eighty acres of bottom land, with that entire curvature of the old channel a chain of stagnant pools with muddy margins in the midst of that rich bottom land. The sanitary census, as taken under the supervision of the local health officer, found, in a total population of 1,475 inhabitants, 672 persons suffering from malarial fevers; and at the time of the inspections made by the State Board in July and August last, groups of ten and more dwellings taken consecutively, and nearest the miasmatic area on which are no dwellings, had fever and ague in every house, and in some of

the families with as many as ten members, every one was sick with that malady. The report upon the last-mentioned village and the sources of the evil that has come upon it, as submitted in a subsequent chapter, will be examined with interest in connection with a report on the same subject in the Board's first annual report. The fact is shown that malarial fever began to prevail there only five or six years ago. The obvious sources of the miasmatic sickness there must be overcome by comprehensive and effectual treatment or it were better that the village and its factories were deserted.

The nature and pernicious results of locally and even domestically induced sources of prevalent malarial sickness are shown in the reports submitted by the health officer of a little hamlet in Mt. Pleasant, Westchester county, where a member of this Board with Dr. Carroll, an expert inspector, joined the town authorities in the investigation. The facts here presented are deemed worthy of a condensed statement in the appendix of this report. It appears that in a period of three months, out of ninety-one families comprising three hundred and fifty persons, there were only fifty individuals who did not suffer some form of malarial sickness. The causes of this sickness are so obvious and so controllable that we beg to refer to the appended report which is mentioned for the lesson there taught concerning the official conditions by which a naturally salubrious locality may become so unhealthful that for at least one-quarter of the year it were better to abandon the place altogether than to live in it without the sanitary improvements which are clearly pointed out in this report as being an urgent duty of general obligation.

SANITARY SURVEYS AND MAPS.—DRAINAGE AND DRAINAGE AREAS.

In the first steps of procedure to remove or provide against the evils produced by faulty drainage, whether upon domestic premises or in extensive areas and whole districts, the experience of sanitary authorities is that it is highly important to have at hand, or prepare, certain descriptive outlines or maps of the premises or districts under investigation. This is true alike of the dwelling-house and entire blocks, the village and city quarters of some prevalent sickness, or an entire region or "drainage area" where miasmatic or other endemic diseases are complained of; and as there seems to be no exception to this rule, it is found necessary at every step of the improvements as well as investigations conducted by the State Board, to cause such outlines or "sanitary maps" to be prepared. With these in hand, the Board and all parties in interest can proceed with the local authorities to whatever works of drainage, sewerage or structural improvements should be undertaken.

In thus alluding to this general fact and the obvious importance of it, whether applied in the drainage, and even to the plumbing and sewerage of a house and a block, or to an unhealthful neighborhood or extensive district, there is one view of the duty and interests of both the State and local authorities in surveys, maps and drainage areas which is of the greatest practical and economical importance, namely, that, until now, there have been no such topographical and hydrographic surveys made under our State authority as in any manner will

serve the sanitary necessities of communities in the works of drainage and sewerage they are ever projecting and beginning in a faulty and needlessly costly way, and there has been no such general survey and mapping by State authority as we now should have as a basis ready at hand for most important investigations into the local causes of destructive diseases, and for the guidance which should be given to populous communities in their works of systematic drainage, the public supply of drinking water, the selection of building sites and in their adoption of general drainage maps and regulations as a permanent basis of local sanitary protection and improvement. The "State Survey" and the "Adirondack Survey" begin to illustrate the fact that these kinds of work and expenditure by the state are certainly capable of a more generalized and specific purpose of contributing to the means of health and welfare amongst the people.

This matter must before long so greatly interest the State government, because of its demonstrated importance and public economy, that there will be devised and ordered by general law such a system of surveys and mappings of populous districts, and of all the principal water-sheds and basins, or of the topography, hydrography and the economic geography, as shall supply this great general want in the public health-service of the State. Particular cities, as in Rochester, Yonkers and the Westchester wards of New York, have already secured good "contoured maps," but the twenty-one other cities have not, nor have any of the villages and townships, except that the United States Coast Survey has supplied the elements for town contoured charts in the vicinity of New York harbor. In thus mentioning a want which the State government alone can adequately supply, the fact is not overlooked that in the past studies and survey of the "Natural History of New York," these later behests of public health, and the almost infinite wealth of the economic geology of the State had not laid claim to the State's attention. This Board, therefore, respectfully submits for public and legislative consideration, this urgent and perpetual need of a correct basis of expenditure and works for the public health, and would request, beforehand, that whenever the State orders its economic geology and topography to be surveyed and mapped, the requirements of the public health, as herein stated, shall be met.

SEWERS AND THE SEWERAGE PROBLEMS IN THE LARGE VILLAGES AND SMALL CITIES.

As stated in the preceding section, the very first step in the problem of sewerage of villages and cities depends upon a correct topographical map of the area to be sewered. It is a singular fact, however, that only a few of the cities and villages in this State have provided such a basis for correct procedures in their sewerage. It is further true that the introduction of the public water supply has, in nearly every instance, preceded the adoption of a plan of sewerage. Pernicious results, therefore, have ensued from water-soakage and wetness of the grounds around dwellings and under them, thus giving rise to local conditions adapted to induce house-epidemics, not only of acutely destructive diseases, but of pulmonary and constitutional disorders, which terribly discount the value of human lives as well as greatly abbreviate them.

In recommending and adopting plans of sewerage, there are plainly certain perils no less than obvious advantages and claims of decency to be considered. The advantages are :

(1.) The removal and riddance of all excremental and filthy outflowing from dwellings and premises to such distant delivery as the plan of such water-carriage of the sewage-matter shall provide for.

(2.) The water-carriage itself, in the plans for such removal, is in many places a convenient means of riddance of the overflowing abundance of the water as supplied in the house and upon the premises.

(3.) The more or less complete removal from the entire areas of the habitation and of the village and city, of sewage matters they discharge into the public waters beyond such limits.

The perils against which but little provision hitherto has been made in the general plans of sewerage and drainage of our cities and villages, as now witnessed in more than nine out of ten, are probably:

(1.) Conspicuous failures to provide properly for the ultimate outfall or disposal of sewage matter.

(2.) As shown in this Board's report last year, the combination system of sewage with adequate capacity to receive all storm-waste as well as the little stream of mere sewage, which sewer as the subterranean conduit in a village as well as in populous city streets, results in considerable harmful risk from accumulations of decomposing sewage during the intervals of the water-flow, chiefly dependent upon showers and storms; a peril which may be obviated in a great degree by adopting this separate sewerage system.

(3.) The faultiness of sewer connections at and within houses that are sewered, and especially the defects and faultiness of sewerage and drainage, or what is known as house-plumbing in dwellings.

The discharge of sewage, carelessly, into running streams and other public waters which are subject to daily use as drinking water and for other domestic purposes, is perilous and wrong ; although but a small number out of any particular thousand people who drink the water polluted by thousands of other persons' excremental outflowing — unspeakably filthy as such a practice is — may be killed in any one year by this means, and it may not come to be proved that a person was so killed, or was harmed, yet such a practice is dangerous and should be restrained and wholly prevented, or so guarded and corrected as to overcome any cause of harm.

Concerning conclusions the Board has already published in relation to the grounds for the preference of separate sewerage and the most economical, thorough and cleanly methods for the water-carriage and disposal of sewage matter, the Board would, in this report, reassert the position it has assumed and the reasons it gave for advocating the adoption of the "separate system" of sewerage for large villages and small cities in the State.

In the investigation of sanitary wants of school-houses, there has been found to exist a most urgent demand for thorough reform in the facilities and methods in detail for answering sanitary, and for that matter even the physical and moral conditions of school-houses, sinks and sewerage.

HOUSE-DRAINAGE AND SEWERAGE.—THE SANITARY PROBLEMS OF HOUSE-PLUMBING.

Among the luxuries and comforts of modern civilization, in the domicile and all great resorts for recreation, business, rest or travel, none at present are more studiously and expensively the subject of provision, construction and adaptation, than the fixtures, etc., which are known under the title of "house-plumbing."

Though the analogues of this luxury of the modern house and place of assemblage were found in Rome and in the cities and palaces of the Roman Empire, in its Golden Age, the Forum for the daily great assemblies and the vast amphitheatre of the Coliseum being outfitted, at immense cost, for the accommodation and physiological necessities of the assemblages of tens of thousands, structural questions, which are at present discussed with extreme difference of opinion and assertion, will have to be settled upon a basis of scientific and experimental judgments which certainly are now entirely possible and urgently demanded.

By a series of experiments, skillfully devised and scientifically conducted by the most practical sanitary engineers, conversant with all the details of the plumbing art, under auspices of the National Board of Health, in Boston, last summer, there were demonstrated the conditions under which nearly every form of modern waste-pipe traps, used in dwellings and hotels, are in daily experience "syphoned" and rendered useless. At the same time the conditions were clearly demonstrated under which properly adjusted traps may be securely kept sealed and effective.

While not a few persons have deemed it a duty vehemently to denounce all attempts and methods of constructing within any domicile or house, the lavatories, baths, sinks, water-closets, etc., which modern convenience and comfort certainly will not relinquish, the question arises, as one of paramount importance for sanitary advisers and investigators to determine as correctly and promptly as possible, whether it is practicable to adopt and regulate the needed structures for all the purposes here mentioned within dwelling-houses, hotels and public institutions.

It seems to be a duty incumbent upon sanitary authorities, and especially upon this State Board of Health, which in some sense has advisory relations to twenty-four cities, and hundreds of populous villages, to be prepared at all times to take the most correct view of this important general subject of domestic sanitation. Without discussing in this connection the reasons in detail for the opinion here to be expressed, this Board's opinion and belief is, that all the requirements for the entire security and welfare of families and inmates of all classes of dwellings and institutions can be attained, and the buildings be made subject to such inspection, prescribed regulations and record as to give full warrant to families and occupants, that they are rightly outfitted and regulated in their entire house-plumbing, and that so far as these fixtures and necessaries for cleanliness, health and comfort are concerned, all the sources of peril are overcome and prevented.

Though it be true that there is comparatively little of such correct plumbing and domestic protection at present, the practical science and

art for providing it already exist; and plumbing as a trade and art has rapidly become an honored guild in the cities of New York and Brooklyn under the influence of the timely and judicious legislation by which the State of New York has required the protection of the public and domestic health in those two great cities. Conspicuous opposition to the reforms required and enforced under the metropolitan plumbing law has been overcome, together with the "scamping" and ignorance that have been superseded by skillful and honest workmanship in this most out-of-sight and much-abused handy work of contractors in the construction of modern dwelling-houses.

Numerous discreet and public-spirited citizens in different parts of the State have, again and again, suggested to the officers of the State Board of Health that a faithfully administered sanitary law for securing mechanical and hygienic perfection in house-plumbing work ought to be enforced in every city and village in the State. It is not impossible that this will prove to be the *dernier resort* for securing protection against frauds and ignorance in the work of our dwellings and public houses, and their sewerage.

It is claimed by the advocates of such a generalization of sanitary laws and regulations to protect the health of hotels, school-houses and other public resorts, as well as dwellings constructed by contract, that without the operation of such a protecting authority, the most precious lives will be liable to unguarded exposure to causes of unexpected fatal disease.

This view of the subject is certainly worthy of consideration, and it would be fortunate if a practicable way is devised for realizing the protection thus claimed for human life and health. Until there is some such general provision of law, local sanitary authorities must do all in their power to secure attention of householders and the faithfulness of builders and plumbers to guard against the dangers that lurk in all the emunctories and outflowing of the common dwelling-house and places of large assemblage.

In concluding this brief chapter, attention must be called to the fact, that wherever there is an attempt to provide cloacal and waste-pipe conveniences without a copious water supply for frequent daily flushing and cleansing on the one hand, and on the other, wherever there is not a sewerage and drainage system provided upon the premises, and in the streets where water is laid on, in and about the buildings, there will be such liability to wetness of grounds and premises as to induce fatal miasmatic conditions. In short, the luxuries and means of health and comfort for modern civilization call for vigilance and skillful adaptation without which the wilderness itself may be more healthful and inviting than the most costly mansion and opulent city.

Tenement Sanitation. Regulation and Sanitary Supervision of Tenement-Houses.

More than in any other State in the Union, the poor and nearly all the laboring classes in the chief cities of New York are domiciled in tenements at monthly or weekly rental. The statute relating to tenement-houses in New York and Brooklyn defines them as dwellings in which "more than three families, living independently of another, and doing their cooking upon the premises," etc., hire or lease their homes. The

first law for the sanitary regulation and protection of this class of habitations in the metropolitan district was enacted in 1867. Evils which then had been scarcely twenty years in progress, or that were scarcely noticeable elsewhere in this State than in the two cities just mentioned, have rapidly grown with the increase of city populations, until now in at least seven cities and a greater number of manufacturing villages the crowded tenement houses are obvious sources of danger to the public health.

As more than half the inhabitants in this State reside in cities, and as the number of families that live in tenements in which they have no ownership or abiding interest, is rapidly increasing, we deem it a public duty to invite the serious attention of the Legislature to this subject and to the urgent necessity for extending the provisions of such a statute to all cities and incorporated villages of more than ten thousand inhabitants. By the same law the sanitary regulation of common lodging-houses would be provided for, and as this class of disease-breeding places have recently become sources of danger within the jurisdiction of town boards of health, the latter should be required by law to enforce the same sanitary rules as would be required in cities and large villages. In one such lodging-house or shanty occupied by railroad laborers the past summer, this Board found that four deaths from fever had occurred in a brief period, and that the last one certainly died of typhus. Presumably all died of the same contagious malady, though the non-medical coroner certified them as cases of typho-malarial fever. The communities of the State, separately, may, at times, be utterly powerless to protect themselves against contagious and filth-diseases of the unsettled and itinerant people who crowd the cheap lodging places along the great thoroughfares of the State. This Board has found it absolutely necessary during the past year to invoke a great number of local sanitary authorities and large employers to inspect and regulate the lodging places of laborers. Skilled inspectors have been sent by the Board to aid in this duty, and this experience as well as that in the crowded and unregulated tenement-houses in the cities and manufacturing villages warrants the application of an adequate general law which every local board of health can administer, and which the State Board shall invoke with adequate authority whenever the public safety requires.

RAILWAY TRAVEL SANITATION. STATIONS, PASSENGER COACHES, SICK PASSENGERS, ETC.

The millions of passengers who travel upon the railroads during the year represent an aggregate of life and health interest which is worthy of all the protection that can be secured. Fortunately the chief railway corporations and superintending officers respond to any well-authenticated official sanitary requests; yet, in this State, there is no such specific provision of law, as experience has shown to be necessary, to secure adequate protection to the health of passengers. The conditions to be improved and the evils to be prevented relate to the ventilation and systematic cleansing of all passenger coaches, the care of sick or injured passengers, the effectual vaccination and protection of life of railway employees and the sanitary supervision and policing of railway stations.

Without any disagreeable interference there can and must be a great improvement in regard to each of the conditions here mentioned. Self-interest and a commendable regard for the comfort of passengers, have greatly diminished the evils which public carriers formerly imposed upon their passengers, yet the existing evils seem to demand reform by exact sanitary regulations, which no competent officials in the passenger department of railway service could consistently decline to enforce throughout the extent of their lines. This Board has already advanced its inquiries sufficiently to promise a useful presentation of the subject to the railway officials and, if need be, to the Legislature.

The facility with which even a reckless person with small-pox may take his seat on a couch in a coach amongst a crowd of other passengers was illustrated in the case of James Weston, who with the coach he occupied was ordered by the Board to be instantly shunted from the train on which he was discovered on entering the Hornellsville station, after riding all the way from Cincinnati. The possibilities of the contagion of disease being unsuspectedly conveyed are confessed, and they should be prevented as far as practicable by sanitary cleansing of all the coaches. Even in the instance we have mentioned there were garments hastily locked in a satchel of an alarmed passenger near the sick man, and after thirty-two days the garments and satchel were, for the first, opened in an isolated dwelling in Schuyler county, to become, unsuspectedly, the focus of a destructive scourging by small-pox.

The sanitary requirements of cars and stations in the matter of ventilation, healthful warming, necessary conveniences and policing should be secured upon all railways. The security of trains and the precious human freight they bear can be vastly enhanced by the business-like adoption of certain well-ascertained physiological facts in the rules for the selection and the prescribed service of each class of those employees whose default in duty have hitherto sacrificed so many lives by the preventable disasters of the trains. It is not from want of willingness and desire to be faithful in duty, but from want of the actual physical conditions or of the training and complete fitness and government of the persons who so fail in the service on which life and limbs of passengers depend, that the preventable casualties occur. The result of a fair presentation of these facts to the railway officials by this Board will be ascertained before any special law upon the subject is reported to be necessary. It is hoped that even in the prompt adoption of some kind of signal-brush to save the lives of freight-train brakemen and others on top-service when approaching low bridges, will be voluntarily undertaken by the road officials. Like the duty due to engineers and the switch and signal-men, in allowing and even requiring rest and strict habits of routine for them, for their welfare and the lives of passengers, so, for the saving of train-men from mutilation and death, and their families from desolation and want, all necessary precautionary means should be taken to prevent harm to them.

The State Quarantine System. Sanitation of Emigrant Ships and Emigrant Trains.

From Colonial times until the present day, the quarantine system of the port of New York, the State legislation under which it has been

developed, the vast interests of the world's commerce that have demanded the adjustment of this system and the laws relating to it, and the interests and rights of maritime trade, together with the necessity for protecting the public health, not only of the State, but of the entire country, and the marine hygiene of commerce itself, have given to this system a degree of completeness, and, in many respects, a wise adaptation, which must be considered as highly creditable to this Commonwealth.

When, in 1799, the Legislature of this State caused the purchase of an extensive tract of the most beautiful part of Staten Island, upon its eastern water side, for the exclusive use of the quarantine station, nearly eight miles away from the city of New York, it was no doubt believed that this quarantine hospital establishment would be sufficient in extent, and would continue to be sufficiently remote from the metropolitan population to afford the desired security against exotic contagions and the diseases which are bred or carried in ships.

The millions of emigrants who have been brought under sanitary observation at this station, and later at the new station, several miles down the bay, have presented their special separate sanitary necessities, quite different from those which the ships and cargoes infected with yellow fever have required; yet the State has munificently provided for each of these urgent demands of maritime sanitation. Two amply-extensive islands have been constructed, at great cost to the State, in the midst of the lower bay, two miles and more off the shore; the Health Officer's residence and official station were some years ago established near the Narrows, nine miles from the city. With these facilities for administrating the State and National quarantine regulations, at a distance sufficiently great from the metropolis, the two millions of people in the metropolitan district have for many years past reposed in safety from exotic contagions; while the restrictions and embarrassments incident to quarantine regulations have become less and less onerous. There yet remains a great defect in the laws and methods by which the quarantine system is supported in this State, and especially with reference to certain sanitarily essential provisions for the maintenance of emigrants and others who should be detained, cleansed or vaccinated, as the case may be, to secure the general protection of the public health as well as their own protection. As the necessary authority to so detain and incur, occasionally, certain expenses for the general welfare will have to be a matter of statutory enactment by the State or the National Legislature, or both, this Board finds it a duty here to urge, that it shall be provided for without longer delay. That the State will not fail to protect its chief port and the entire line of exposure of which it is the center, so far as it relates to exotic sources of yellow fever, there need be no doubt. Entire success has crowned its efforts in this respect. For a long time past the State has actually capitalized the means for such success in constructing its two quarantine islands in open tide-way in the midst of the lower bay, and a well-selected station at the entrance to the port of New York.

Henceforth the leading question will be, so long as foreign emigration continues at its flood, how shall complete immunity be given to the pathways and first lodging places of the immigrant population, that passes by the thousands weekly through the landing places of these people, as respects the contagious diseases they frequently bring

with them? Cleansing, disinfection and vaccination must be practiced even beyond the extent of any existing provisions of our statutes.

This Board, from its organization, has undertaken to induce the necessary official and commercial action to secure the result here predicated as dutiful and necessary for the State and toward the entire country. The Health Officer of the port, as a member of this Board, has loyally aided and led in this duty, for it and the State. In his special statements, as chairman of this Board's committee on quarantine, as published in the first two annual reports of this Board, the natural and present situation of these questions before the State and country at large have been lucidly presented.

In an appended chapter to this report will be found still further information upon this subject, especially in reference to the effort to secure adequate sanitary observation and care of emigrants *in transitu* from the seaboard westward. A line of special sanitary inspection and care of emigrants before passing the western frontier of the State of New York was undertaken early in the summer of 1881, and has continued until the present time, with considerable interruptions. On June 1, 1882, this duty of inspection was organized on a systematic basis in reference to the co-operation of several other States that are from time to time imperiled by the contagious diseases of emigrants.

The National Board of Health undertook to lend its generous aid in this work, and for several months that Board paid a moderate stipend to the medical inspectors of emigrant trains employed in this and the four or five other States which united in the plan adopted in New York. Embarrassments in the finances of that Board, however, left this kind of inspection in our State to be maintained independently. The National Board has, however, continued to pay the expenses of one inspector at the quarantine station, with instructions to do whatever is possible, under direction of the Health Officer of the port, to increase the security of the entire line of emigrant transportation against small-pox.

The Health Officer, Dr. William M. Smith, has succeeded in securing a vast improvement in the sanitation of the emigrant ships entering the port of New York, especially in the matter of vaccination and revaccination of emigrant passengers on board, yet he reports and continually deprecates the culpable ignorance, unfaithfulness and neglect which continues to characterize the so-called vaccination of emigrant passengers. A duty of the utmost nicety and the most responsible of any that ships' surgeons, medical officers and physicians ever perform, is still attended to in an indifferent and unworthy manner, producing publicly harmful results. The whole subject of vaccination as an obligatory duty, or as a medical service in any manner discharged under public instructions, must be more worthily conducted, even if penalties for professional indifference to the duty have to be imposed by law.

This subject in its wide extent and general relations to the protection of the public health, and the obligations of State and local authorities, is further exemplified and discussed in a subsequent section of this report. Before dismissing this topic, the Board would here mention with the satisfaction with which it has to acknowledge the prompt acceptance of the onerous and unpleasant duty of receiving — on telegraphic communication — emigrants found on board trains *in*

transitu westward, sick with small-pox, by local health authorities at Buffalo, and others dangerously sick with diphtheria, or with certain acute contagious fevers at certain of the villages and cities where the medical inspector of trains has telegraphed his request ahead, to secure the acceptance of the sick and their domestic quarantine for the sake of the sick, and the sanitary safety of the moving company of emigrants.

Nothing could exceed the consideration and munificent preparation which the town of Niagara (the most exposed to dangerous exigencies incident to emigrant travel of any place, excepting Buffalo, upon the western frontier of this State), has made for meeting every exigency of this kind, for it has constructed a contagious disease refuge in a ten-acre field, leased for the purpose for a term of years, and offered to this Board all the facilities so prepared. The hospital of St. Mary's, at Rochester, also, through the health commissioner of that city, has received from trains patients thus removed, on request of the train inspector. While at Buffalo, the municipal health officer has responded to requests telegraphed by the train inspector an hour in advance of the incoming emigrant train, and held the small-pox ambulance in waiting at a turnout near the station, to receive cases of small-pox discovered in the moving company, at the same time adding to this service the disinfection of cars and equipage.

This service rendered by local health authorities is in striking contrast with the earlier experience of previous years, when train officers, unadvised, upon discovering small-pox among the passengers, were not only panic-stricken themselves, but, by repeating their words of fear, caused panic at every station for hundreds of miles, and at last let the sick and their contagion pass across the western frontier. It is believed that an end has been put to this source of danger, and that no discovered cause of contagion will be allowed to pass over the boundaries of this State. The fact must here be mentioned, to the credit of the public carriers and others, that a loyal disposition has been manifested by them to strictly comply with all the regulations for the protection of the public health.

Such are the existing facilities for rapid transit from ocean to ocean, and from continent to continent, that contagion current in cities upon the Atlantic is soon current in those upon the Pacific coast and along the whole line of railway stations for three thousand miles; while contagions current on the continent of Europe again and again have proved how readily they can become current in our own country. Thus it is every year demonstrated that municipal and State sanitary regulations are essentially necessary as a basis of interstate sanitation and international protection to the public health; while the State and national regulations already have begun to establish the basis of, and prove the necessity for, a concession of international sanitary law and practice as a basis of assured protection of life and health and of the world's travel and commerce.

The State Board of Health of New York has not been unmindful of this world-wide obligation of the sanitary service which it in part administers, and concerning which its counsels have been widely sought and most carefully given.

THE SMALL-POX SCOURGE.— THE PUBLIC DUTY OF AND PROVISION FOR VACCINATION.— BOVINE VIRUS AND PUBLIC HEALTH INTERESTS CONCERNING IT.

The scourge which in successive centuries decimated the people of Europe, and elsewhere also destroyed millions of the human family, sweeping entire tribes into oblivion through the most horrible death, yet perpetuates itself in all countries by its loathsome contagion. What small-pox began to do and what it threatened in the State of New York since this Board obtained the organization and coöperation of local boards of health have been referred to in a preceding section. It remains to be stated that certain great interests of the State now demand that these lessons of experience, and the present advanced condition of both the knowledge and means for giving complete protection to the entire people against small-pox, should be the warrant for adopting all the necessary resources of medical science and of sanitary administration to give such protection.

This Board has, from the date of its organization until now, vigilantly watched for the discovery of all unguarded sources of small-pox contagion, and has offered to the people throughout the State all the aid, instruction and official authority it could command to control and prevent this scourge. The local boards of health and the people generally have heartily seconded this duty of sanitary officers. Even in the few instances that disputants of such duties — the anti-vaccinationists — have objected to particular sanitary regulations, such opponents have quickly subsided, and in several instances have personally thanked the officer of this Board who met their objections and secured compliance with orders. The people are prepared and waiting for the best laws and sanitary regulations that can be carried out in this State for entire protection against small-pox. The occasional exhibitions of personal skepticism concerning the protective influence of vaccination are as nothing in the balance when the confidence and experience of the people supports the conclusions of sanitary science and the recent provisions of law, as well as the regulations and instructions by which vaccination and re-vaccination are made obligatory. The suggestions here to be offered, for the purpose of perfecting the public health service in regard to the means for complete protection against small-pox, relate to the duty and methods of the State and the sanitary authorities rather than to any contention with the people in regard to what should be done. In the presence of a destroyer so hideous as small-pox, and with means of protection and entire immunity against it which sanitary science has made trustworthy and complete, this Board has addressed itself to the people of every school district in the State, announcing in few words and the printed regulations authorized by statute, that all attendants at the public schools should be vaccinated; while through the local boards of health the same counsel has been accompanied with this Board's assurance that vaccination and the full protection by re-vaccination must be placed upon the footing of obligatory sanitary duties. Neither the local authorities nor the school officers have demurred. The practical questions that have arisen are duly noticed in the points here to be stated. The Legislature has authorized the public school officers to require the presentation of evidence of vaccination as a condition upon which the attendance of

any pupil shall be allowed to continue after due notice to families. All local boards of health are empowered to provide for the necessary vaccination at public cost for the vaccinal matter and service. These boards also have ample powers to quarantine and restrain from any dangerous intercourse the persons, places and materials deemed capable of infecting others; and, in addition to this, experience has proved that in the central relation of the State Board to the local authorities and to the protection of the public thoroughfares against the contagion of small-pox, it is occasionally necessary to require that persons and things infected shall be so transferred, from trains, etc., to the local sanitary authorities at the nearest station where the State and the local board may have means for giving the required care. Three cases of small-pox have been found and so removed from express trains during the past year, the notification to and advice from this Board being by telegraph, while the hazardous and costly service was borne exclusively, and without demurring, by the place and its health authorities to which this Board consigned the sick and their infected baggage. In one instance the cost in cash, exclusive of a fortnight's medical attendance, was nearly $50. In another, a citizen of Albany county, en route from Cincinnati in a crowded express coach, the eighth day in his small-pox, was ordered removed at the Hornellsville station and transferred to the contagious disease refuge of the town, where he soon died, and where an attendant of the abandoned railway coach also lost his life from the reckless traveler's contagion. In addition to the cases of small-pox, the Board has provided for similar transfer and care of other dangerous contagions, and in order to be ever ready to meet such exigencies and deal justly with local authorities, this Board would, if authorized, certify all accounts of such costs as are necessarily incurred by them, and pass the same for payment out of any funds which the State will make available for the purpose. Inasmuch as the Board has supplied every town and village in the State with exact practical instructions and descriptive plans and illustrations to enable them to provide and be ever ready for the sanitary care of the acute contagious diseases, and may now as readily communicate with local authorities by telegraph as by mail, all the promptitude and authorization necessary for perfecting such occasional service for general sanitary protection are now practicable.

The important question is now asked in every community, What can be effectually done, by State or local measures, to induce all classes of people to attend to the duty of vaccination, and especially to make perfect the vaccination of children? This Board has been led to consider this question very seriously, as every outbreak of small-pox that has extended beyond the first household has revealed the fact that in particular districts so affected there had long been a culpable neglect of vaccination in the families. To this fact has usually been added convincing evidence that re-vaccination has been equally neglected, and, likewise, that spurious and utterly deceptive kinds of vaccination have been extensively practiced.

The proper answer to the question, What can be done to perfect the general vaccination of children? is now to be found in the adoption of some system of notification, advice and obligatory attention,

which shall omit no family or custodian of children, and which shall, as shown in a report by the Secretary of this Board at its quarterly meeting in August, 1881, use the public registry of births in every town, village and city of the State as the lawful directory and basis for such notification, and also employ other available means for reaching every family, asylum and school. This can soon be wrought into a system acceptable and adapted to the people, and in due time whatever enactments of law are desirable, will be asked for. The Secretary of this Board, acting as Superintendent of the State Bureau of Registration and Vital Statistics, will be directed to organize this service so as to unite all the registry and health officers in the system of notification, information and record. It is believed there may be no less success in New York than in Scotland under such a system to secure the vaccination of young children. Experience has shown in the latter country that not less than ninety-six out of every one hundred infants recorded in the birth registers are successfully vaccinated before their first birthday. The few details and essential features of the system as adopted for this State are presented in the report above referred to, as appended in a subsequent chapter.

Thus far in its official dealings with the people and all local authorities in matters relating to the suppression of small-pox and to the presentation of vaccination as an obligatory duty incumbent upon every community and household, the officers of the Board have proceeded, and all utterances by authority of the Board have been, upon the basis and full belief that the State requires not only the absolute and instant suppression of all contagion, but the prompt and effectual vaccination of every human being, even though he bear the marks of small-pox. That the individual receptivity for the contagion be, if possible, utterly extinguished being as much an obligation in civil life as it is conceded to be in armies and navies, the duty of re-vaccination for this purpose is enjoined and explained among all classes of people. Alas, while thus officially instructing and assisting the vast population of our State in these duties which we regard, and teach them to regard, as being in the highest sense obligatory and to be neglected by none, the mode of medical and even of the official performance of vaccination, the obligation of local authorities and of the State itself to secure the assured means of success and perfectness of the marvelous attributes of kine-pock in all vaccinations, and the necessity of absolute confiscation and prevention of all spurious vaccinal virus, yet remain to be provided for by authority of law. As a statesman in public health government, Mr. Simon, of the English sanitary service, said in his report to Parliament: "No principle can be more obvious than this: that if the State professes to vaccinate the people, above all, if it compels the people to be vaccinated, it must take every possible security for the excellence of the vaccination it offers." And he adds: "What has to be administered is not a mechanical matter of routine, * * * but a system which from beginning to end, and from center to circumference, requires in all its parts to be vitalized by the science of medicine." Holding, therefore, that what the laws "invite and compel the people to accept shall be at least of good quality," this Board now submits the following propositions as fairly expressing the principles of sanitary duty concerning vaccination and the lawful measures for making it obligatory :

1. The skill and carefulness, as well as the perfect purity and efficiency of virus required for securing genuine vaccination, demand the watchful and systematic attention of boards of health. For this reason every board of health should provide ways and means for speedily supplying fresh vaccinal lymph of highest excellence, and, by its medical officer, should be prepared to offer free vaccination and to give practical instruction in the duty and the art of vaccination.

2. The vaccination of infants within a few months after their birth is so necessary for their own and the public protection that it is a duty of the State to adopt a system of notification and advice to parents and physicians to secure the timely vaccination of infants. This duty is so readily associated with the registration of births, and, later, with the first entrance of the child as a pupil at school, that no practical difficulty need be experienced in securing the general vaccination of children. After all, it is sure to be found less a matter of compulsion and penalty than of enlightened and patient official and professional administration of a supreme hygienic and public duty, by which vaccination thoroughly good and universally practiced among all classes is to be secured.

3. Ignorance and indifference in the medical application of vaccination, whether in public or private practice, must, as far as possible, be prevented. Boards of health, by a perfect example in the practice and instructions publicly offered, and medical schools and all dispensaries and physicians, owe to the people such instructions and examples, and with this in view, they should provide for scientific and practical instruction in the principles and art of vaccination.

4. Spurious vaccination, and every form of impure, unattested and untrustworthy vaccinal virus must be excluded from use, and, to this end, all the various sources or stocks of virus offered for sale, or for gratuitous use, should be subjected to such occasional and conclusive tests as shall determine the actual quality and validity of it as vaccinal matter or kine-pock. This duty may justly be required at the hands of the State Board of Health by any means it shall devise and make entirely practicable, as aided and made effectual throughout the State by the local sanitary authorities. Bovine inoculations, and close inspection of the development of the kine pock, being the means for testing the validity and qualities of the animal vaccine matter; and, for the testing of humanized vaccine, the daily close observation of development of vesicles and areolas, and the subsequent verification by means of the bovine virus of proved efficiency being conclusive, the actual quality and fitness of any vaccine matter, so called, which is offered or found in market, may readily be tested. Such verification, when made by authority, and as a public health duty, will be trustworthy and final, and should result in the exclusion of all kinds of spurious and faulty vaccinal matter wherever found and however disposed of or offered within this State.

5. The cultivation and public supplying of virus by the direct and continuous inoculations of heifers has so universally superseded the taking of vaccine lymph from infants, as practiced in this country until very recently, that the hitherto unguarded traffic in bovine virus calls for a systematic regulation which shall be adapted wholly to exclude from sale and use any and all spurious and deteriorated stocks

of this kind of matter, first, by the official testing as defined in the preceding section, and second, by means of proper encouragement to the perfect culture and supply of bovine vaccinal virus of absolute purity and greatest efficiency. The proposed testing of the validity of all stocks of so-called virus offered as an article of traffic, and the maintenance of the needed investigation of the sources and production of the bovine lymph, with the design to secure the greatest excellence of vaccination throughout the State, may be the most effectual means for encouraging the best production, and practically excluding the spurious and deceptive, or dangerous stocks of animal virus that become a matter of sordid traffic and execrable fraud and harm. Fortunately, the best trusted of cultivators of bovine vaccinal virus, so-called vaccine farmers, can always be relied upon to assist in exposing fraud and the sources of spurious supply, in the demands for the protecting virus; and the medical profession and all local boards of health desire and need the influence of such official methods as shall prevent imposture and disappointment in vaccination.

6. In the effort to induce the medical and official action which shall render the protection against small-pox universal and perfect, this Board will undertake some investigations in regard to the causes of default and neglect in vaccination, and at the same time organize and promote others which shall tend to perfect the culture and distribution of pure and efficient virus, and establish a public record of the examples of highest success in vaccination as proved by the statistics and results of vaccination in successive years. The medical officers and boards of health, and even the records and studies of physicians in numerous communities, may thus contribute the very knowledge and testimony that will be most useful to the people.

In attempting to give practical effect to these six propositions it may be necessary to obtain authority from the Legislature to interfere with and suppress the traffic in spurious and harmful vaccine matter, as well as to encourage the perfect culture of vaccinal lymph, and, in suitable ways, to reward the most complete and useful examples of success in the public duty of vaccination. This Board will make known to the Legislature whatever is ascertained to be necessary in this matter.

Certain Improvements of Laws Needed.

The laws relating to systematic drainage.— As the General Drainage Act of 1869, with its various amendments, has failed to work satisfactorily, chiefly because the preliminary procedures for the organization of special commissioners, the searching of ownership titles, the deciding of the questions of sanitary necessity and of plans for proposed drainage, the determination of damages and assessments, and most of all the raising of funds, upon local securities for the execution of the work, as well as for the preliminary surveys, etc., have brought every such drainage commission under severe censure and revealed some alleged fault of administration of the trust. It is believed that the sanitary facts as well as the preliminary problems of drainage engineering should be brought under such review as would, in each case, leave no doubt in regard to the necessity and the most effectual and economical plan for the proposed drainage, and that from this point

in the procedures to secure sanitary drainage the local sanitary and administrative authorities should be charged with all practicable responsibility in the work, while the State should offer as well as require the expert examination and approval of the plans in detail, previous to their adoption and the execution of the work. Errors, failures and waste could thus be prevented, and the coördination of any amount of drainage in contiguous civil jurisdictions secured.

In all plans and propositions for sanitary drainage, the very first necessity is that of a correct survey and map which shall exhibit the geological and topographical facts clearly, and show precisely what are the best natural outfalls for the drainage streams; and it will be fortunate if the State Survey Office and the Bureau of the State Engineer and Surveyor shall be able to offer such aid in the topographical engineering, and if the State Board of Health can give adequate assistance and acceptable conclusions upon the chief questions relating to the sanitary requirements. It is believed that until the topography and hydrography of the State, at least in its populous regions, shall have been thoroughly surveyed and mapped, the best adapted and most useful law to encourage and provide for systematic sanitary and general drainage in towns and districts must subsidize such central resources of engineering and sanitary science as the State has for the time at command, as here suggested. The Board considers that this is a vitally important matter, as the sanitary fact is well attested that imperfect or half-way drainage is, in many a locality, worse for the public health than no drainage, and that the increase and unlooked-for extension of malarial areas largely depend upon just such interferences with ponds, pools, swamps and the oscillating ground-water of porous soils as result from such kind of half-way drainage. Even where this process, as seen in the water-storage and fluctuation of ponds and streams, is that of alternate flooding and drawing off or lowering of the water, the public health interests demand that whatever general drainage is undertaken, either for health or wealth, should be correctly planned and effectually executed.

The General Drainage Law of 1869 was not to be resorted to in any instance except where the public health requires,* yet it provided for no official sanitary testimony and concurrence. The purposes of that law, and of any good law that shall supersede it, certainly require that official examination and conclusions should be had upon any drainage problem undertaken by the commissioners under the law. Such services can henceforth be given by this Board, but the preparation and execution of the needed plans for drainage of towns, etc., may require expenditures which should be always judicially authorized. The outlines of a suitable form of law to provide for and authorize such works will be submitted to the legislature by this Board.

Law to prevent the pollution of drinking waters.— It is believed the time has arrived when the local boards of health, sustained by such aid as the State Board can offer, should be charged with the duty of enforcing compliance with a reasonable general law to protect the supplies of drinking water from dangerous defilement. Such a statute,

* * * Any person or persons who shall deem it necessary for the public health that any such swamp, bog, meadow, or other low or wet lands shall be drained, may present a petition, duly verified, to the county judge of the county in which such lands lie. (See section 1, chapter 888, Laws of 1869.)

if wisely devised and guarded, would serve both to instruct and protect the people. In several of the most fatal outbreaks of disease in households and neighborhoods, the water for domestic use is discovered to be polluted and poisoned by excremental and other filth. The people will gain much from the warnings and suggestions of such a law as may enable the public health authorities at times to prevent or arrest fatal outbreaks of sickness.

The prevention of obstructions and nuisances in streams and water-sides by decaying mill-waste, etc.—This Board has received, through the Governor and otherwise, several complaints and notices of local suffering in consequence of the obstruction of water-courses and of the occasional drying up or lowering of ponds and lakes as well as by the overflowing of them by means of dams or other obstructions.

These evils, though various and quite diverse in their special character and causes, may, it is believed, be treated under a guarded and readily applied statute. Such a law should be adapted to apply as well to a series of similar evils that may be found extending through adjacent towns and counties, as to a single well, lake or water-course exclusively and in a single town or village. Incidentally, or as a chief cause of sanitary and judicial interference, the action required may be for the protection of the drinking water as used by a village or neighborhood. Yet for the protection of public health, whatever be the cause for action, the scope and extent of the authority exercised must be adequate to prevent and control the causes of the evil suffered and complained of.

To this end the local health authorities, as well as the neighborhoods separately concerned, must be so enlisted in their own defense and welfare that any general or local official instructions and orders will be obeyed with alacrity. As mentioned in a preceding section of this report the State Engineer and Surveyor, with the State Board of Health, should be enabled and, indeed, required by law to guide and give full effect to the necessary local and general orders by which such evils are to be overcome. The necessity of some such concerted action has appeared in nearly every complaint that has come to the knowledge of this Board. For example, upon the Saranac river, when the last and the largest in a series of lumber mills, nearly a hundred in number, between the Adirondack lakes and Lake Champlain where vast accumulations of saw-dust are rotting, was restrained by an injunction to prevent casting its saw-dust into the waters there at the mouth of the river, no action was taken and no method could be devised at the time by the local authorities or complainants at Plattsburgh to restrain the other mills from contributing their quota to the evil. Those mills are in five or six different towns, and in the towns where they are located, excepting in Plattsburgh and Schuyler Falls, no local evils from this cause are at present suffered by the inhabitants. The case in question was brought to the public notice by a public-spirited citizen of Plattsburgh, whose family and neighbors suffered much from the evil complained of. The result of the action was, that the judge declined to make the injunction permanent.* In a case at Fort Edward, Washington county, the people in the southern part of that

* A final procedure resulted in confirming the report of a referee to make the injunction permanent.

village and on the river-borders of that town and of Moreau, Northumberland and Greenwich suffer from the same cause of this great evil. The board of health of the village of Fort Edward undertook, with great spirit, to abate the nuisance so far as it could within the close limits of the village and on one-half the width of the river. Fort Edward expended, during the year 1882, several thousand dollars in the attempt to control the decomposing mass of saw-dust extending over many acres and having a depth which resisted all force to dislodge it.

The greater part of the causes of nuisance are produced in the towns of Queensbury, Luzerne, Corinth, Hadley and still further north upon the upper Hudson. The farther up the stream the saw-mills are, the swifter the river torrents and the more completely free from any accumulation of mill-waste is the river. The people in the upper towns suffer no harm therefrom.

The inhabitants of a neighborhood and town where fatal sickness is caused by the alternate flooding and drawing off of water, often find they have no remedy, and that no local authority can in the least relieve or prevent the cause of their suffering. This is strikingly illustrated in the causes of a fatal epidemic fever at Indian lake, Hamilton county. The control of the outlet of that lake is held by private citizens more than seventy miles and six towns away. These hydraulic franchises need not be destroyed, yet the health and lives of people should be protected, by some adequate means which shall be entirely consistent with all the just franchises represented by mills and hydraulic rights.

Adequate control of such mill-wastes and accumulations of decomposing organic matter in streams and other open waters that are used for a public supply for drinking would prove to be an incidental benefit scarcely less important than that of protecting the atmosphere from miasmatic poisoning by the same cause. The outlines of a project of law to provide against and prevent the evils here mentioned will be submitted to the Legislature.

These three propositions in their relations to each other and separately considered. — This Board will doubtless find it a frequent duty to advise great discretion in the application of the powers under each of the three laws here proposed, should the Legislature see fit to enact them. Yet there is such obvious and urgent need that such powers should be reposed in the sanitary authorities throughout the State, under the safeguards herein suggested, that it is not safe to delay much longer the enactment of at least the guarded authority now asked for.

As regards any general enactment to provide for adequate treatment of natural drainage areas, which most generally exceed the boundaries of a village or township and frequently comprise fractions at least of contiguous counties, as well as adjacent towns, there needs to be competent and disinterested advice and means of final judgment upon each of the general drainage questions which arise. While the legislative powers, by the city charters, enable each city to attend to its own affairs in such matters excepting in regions immediately surrounding a municipal area, towns and villages at present possess no such adequate power and ability to make complete work in their drainage improvements; and inasmuch as a general drain-

age act involves towns and counties in difficulties inextricable, the very first provision for an acceptable method of inciting local endeavors by town and village authorities and real estate owners should plainly invite their hearty cooperation while securing them against exorbitant costs and needless delays. It is hoped this may be accomplished by the means suggested in the foregoing paragraphs.

In regard to the discretionary yet strictly necessary applications of the proposed law for preventing harmful accumulations of mill-waste and other decomposing organic matter in streams and other watercourses, there is a sufficient safeguard here proposed to prevent any unjust effect of such law. During the year 1882 there were more than ten or twelve such instances of harmful accumulations from mills, etc., which required the application of such a law. These cases were too important to have been neglected for a single year.

Concerning dangerous pollution of streams and other open waters, from which domestic supplies are derived, certainly a beginning must be made in the administration of a wholesome law which, in the present state of experience in local government of towns, villages and cities, may not be perfected except by the careful application and study of such lawful restraints upon sources of danger, which at present the people only imperfectly understand. For this reason, any law for preventing pollution of streams and other sources of drinking water may well be carefully defined and limited by the most competent judgment that can be made available, so that no possible misapplication of its provisions shall occur.

CONCLUSIONS AND RECOMMENDATIONS.

As required by section 11 of the Law of 1880, which defines the duties of this Board, the undersigned respectfully submit, as the conclusions and recommendations they now deem first in importance concerning the sanitary wants of the people, the particulars in regard to which further legislative action and precautions are deemed important "for the better protection of life and health."

I. That as regards the life and health of children, it is of the utmost importance that the homes of the poorer as well as the more favored classes should be thoroughly fitted for domestic health, and that as regards what are commonly known as tenement-houses, hotels, apartment-houses and resorts, their ventilation, drainage and sewerage should be constantly provided and regulated in accordance with obligatory sanitary rules prescribed by statute or by the State Board of Health; and that school-rooms should be constructed and outfitted under official sanitary approval; also that the cruelty to children which shuts them in to long continued daily tasks of labor in mills and shops should be forbidden by law.

II. That as respects the protection of households, schools and communities against acute contagious diseases that are liable to be spread from person to person and from place to place, the authority of the local boards of health and of school boards in regard to these dangers should be invoked and upheld in every community; and, if the Legislature will so provide, that the State Board of Health should have power, and that it should be its duty, whenever there is local neglect, to cause the said sanitary regulations to be faithfully enforced.

III. That, under a judiciously guarded central direction, there should be maintained, in cities, villages and even in every township, a sanitary inspection of school-houses, school-rooms, school-house drainage and appurtenances of schools and seminaries, both public and private and of every grade; and that this duty shall also extend to the determination of whatever means are necessary to secure protection against fire, against cold, and against overcrowding as well as against contagious diseases. That, at present, it is plainly a duty, as well as a most feasible plan for attaining this object, to require that every board of health in this State shall, in accordance with definite instruc-

tions and any necessary official aid from the State Board of Health, maintain a systematic sanitary inspection and oversight of all school-buildings and school-rooms, as an established branch of its official duties. It is recommended that this be required by law.

IV. That the maintenance of a strict supervision of a system of aid and advice in regard to vaccination and the exclusion of spurious or harmful vaccinal matter from sale and use within the State, the encouragement and regulation of general vaccination, and the prompt enforcement of appropriate penalties for any neglect to prevent exposure and distribution of the contagion of small-pox, should be required by law.

V. That in the course of investigations which this Board is pursuing in regard to the causation and the means of more certainly preventing infectious diseases, and in the progress of the researches which are being made concerning perfect supply and skillful maintenance of the kine-pock, or "bovine virus," this Board finds ample reasons for enlarging and continuing a special line of practical investigation and of necessary contribution of facts, now required by the medical profession for the public welfare, in regard to kine-pock, and a more complete protection of the people against small-pox. For this reason, a moderate expenditure is being made by the State Board of Health with reference to the proposed duty incident to these researches for the supervision and maintenance of the highest perfection and proper use of the kine-pock. A brief form of amendment of law will be submitted to the Legislature.

VI. That for the better protection of the families of the poorer classes, and an increased general security against the widespread prevalence of diphtheria and scarlatina in particular, and of certain other acute contagious diseases, it is recommended that in all cities, and in the populous manufacturing villages, there should be provided, under the supervision of the local sanitary authority, contagious disease refuges and hospitals, as advised and illustrated in this Board's second annual report, and as again presented in this report.

VII. That such provision for refuges and sanitary care should be promptly made whenever small-pox, typhus or other malignant infectious diseases occur within the State, and should be houses of recovery for the sick, as well as of effectual separation and control of dangerous contagions.

VIII. That for promoting and authorizing the sanitary drainage of sites of villages and hamlets, and of miasmatic districts, however

limited or extensive, certain statutory provisions, corresponding with the specifications given in one of the concluding chapters of this report, need to be enacted by the Legislature. For this purpose, the outline for such an enactment is herewith submitted.

IX. That in the midst of existing controversies and much harmful practice relating to domestic sewerage and plumbing, there must be a competent and skillful supervision and the exercise of an official sanitary judgment in regard to the plans and execution of such work in all the cities, populous villages, hotels and public institutions in the State.

X. That in the administration of laws relating to the prevention of adulteration and harmful changes to which food and drugs are subjected, and in relation to the statute for preventing the sale and dangerous use of explosive illuminating fluids, the State of New York and its Board of Health seem to be constrained by the very circumstances of positive constitutional restrictions which prevent any tax for official inspection and permits of articles sold, to maintain all the necessary supervision and expert analysis and testing, as a general charge, which can be provided for only by a yearly appropriation of sufficient funds for the maintenance of this kind of service for the protection of the life and safety of the people. Adequate appropriations for this work will need to be annually renewed.

XI. Experience now shows that there is urgent need in all the populous districts of the State, and indeed wherever miasmatic and other localized outbreaks of disease occur, that systematic topographical and hydrographic surveys and maps should be made by the State, and that, as shown in a concluding section of this report, such local surveys and maps may readily be prepared with reference to the sanitary topography and geography wherever there is provided a well-devised survey and mapped description of the topography, hydrography and economic geology of the State. Therefore these sanitary uses of future surveys are to be kept in view, and also certain limited surveys and local sanitary drainage-charts should be separately provided for until the larger surveys and charts shall have become available. It is true public economy to promote these works, as in the interest of the public welfare as regards systematic drainage and vitally necessary improvements and protection of water supplies and general sanitary safeguards.

XII. It is earnestly recommended that, as a means of generally diffusing and successfully inculcating the most essential kinds of sanitary

knowledge and practice where now most needed and available amongst the people, in every normal school, academy, college and university, and especially in every medical school, the essential principles of public, domestic and personal hygiene should be taught and illustrated, and that by every means which local boards of health, the medical profession and all the educated classes can devise and encourage, the people should be instructed in the knowledge and art of healthy living.

Called into existence by the Legislature of 1880, after twenty or more of the States had founded some form of central sanitary service, and after the Nation had gratefully witnessed upon a vast scale the proof that sanitary protection and vigorous health in time of war are equivalent to the strength of armies, the State Board of Health of New York organized its methods of public service on the basis of a broad reliance upon the share and enlightened concern which the people would have in this work and the objects of health laws. The expectations of the Board in this particular are being abundantly realized, for the people are concerned, and in their primary civil divisions of townships, cities, villages and school districts, they are giving practical effect to whatever this Board has undertaken to do in compliance with the purposes and powers defined in the statutes relating to health.

Though not wanting in certain kinds of authority, the policy of this department of the State's service has mostly been directly the converse of centralization or dictation. From first to last, and from center to circumference, the service has been and will be chiefly a work of studious instruction and guidance in the work required, the coördination of means and methods for practical ends, and bringing to bear the results of investigation of subjects that are at once of general importance to the public health and vitally essential to the sanitary welfare of particular communities which seek and receive the benefits of this service in the name of the State.

To exalt in the common estimation and view of the people, in their communities and families, in their local government and their legislation, and in their general participation in sanitary duties, a controlling regard for the sanctity of human life and the measureless value of health, is the growing purpose of the State as expressed by its Board of Health; and, in this service, while organizing and maintaining the safeguards of health and life, and searching out and smiting their preventable foes, it will be found that the most prolific sources of misery, degeneracy, pauperism and all the disease-engendered burdens which afflict the people and vex Legislatures, are unmasked, and may

be vastly diminished by the self-same agencies of sanitary and social improvement which extinguish the sources of fevers, miasms and deadly infections, and which offer the boon of health and bodily vigor in the fullest measure amongst all ranks of the people.

Respectfully submitted,

Edward M. Moore, *President.*
Erastus Brooks,
J. Savage Delavan,
Charles F. Chandler,
Leslie W. Russell,
William M. Smith,
James G. Hunt,
Jas. T. Gardiner,
Elisha Harris, *Secretary.*

Members of the State Board of Health.

Albany, *February* 20, 1883.

APPENDIX.

The official lists of standing committees of the State Board of Health for 1882–83 are as follows :

Executive and Finance Committee.

Hon. Erastus Brooks, *Chairman ;* Prof. C. F. Chandler; Dr. E. M. Moore, *President ;* Dr. E. Harris, *Secretary.*

Sanitary Committee.

Prof. C. F. Chandler, *Chairman ;* Dr. William M. Smith ; Dr. E. M. Moore, *President ;* Dr. E. Harris, *Secretary.*

Committee on Registration and Vital Statistics.

Dr. J. S. Delavan, *Chairman ;* Dr. J. G. Hunt ; Dr. E. M. Moore, *President ;* Dr. E. Harris, *Secretary.*

Committee on Sanitary Legislation, Rules and Regulations.

Hon. Attorney-General Russell, *Chairman ;* Dr. J. Savage Delavan ; Dr. E. M. Moore, *President ;* Dr. E. Harris, *Secretary.*

Committee on External and Internal Quarantine.

Dr. Wm. M. Smith, *Chairman ;* Hon. Erastus Brooks ; Dr. E. M. Moore, *President ;* Dr. E. Harris, *Secretary.*

Committee on Public Institutions.

Dr. James G. Hunt, *Chairman ;* Dr. J. Savage Delavan ; Dr. E. M. Moore, *President ;* Dr. E. Harris, *Secretary.*

Committee on Drainage, Sewerage and Topography.

Prof. James T. Gardiner, *Chairman ;* Hon. Erastus Brooks ; Dr. J. G. Hunt ; Dr. E. M. Moore, *President ;* Dr. E. Harris, *Secretary.*

Committee on Effluvium Nuisances.

Dr. J. Savage Delavan, Hon. Erastus Brooks, Dr. Elisha Harris.

Agreeably to section 11 of the act creating this Board (chapter 322 of 1880), that in its annual report it "shall set forth the action of said Board and its officers and agents, and the names thereof for the past year," the following statement is presented :

An Abstract of the Minutes and Transactions of the Board — Year Ending November, 1882.

Special Meeting, Albany, *December* 13, 1881.

The annual report was read and signatures of the members ordered to be affixed.

The sanitary committee reported progress in the investigation of the various methods and instruments for safety-testing of illuminating oils. It was

Resolved, That an additional appropriation of $150 be made for the completion of this work; and that the report be recommitted to the sanitary committee, with instructions to report it back to the President and Secretary complete, for use in the second annual report. The same committee submitted outlines of the reports from the eight analysts employed under chapter 407 of 1881, on the departments of work assigned them respectively. It was

Resolved, That the preparation of the list of articles to be recommended to be exempted from the operation of chapter 407 of 1881, is hereby referred to the sanitary committee, with instructions to consult the Attorney-General, as the legal adviser of this Board, in reference thereto.

The duties of clergymen, undertakers and all concerned in the management of the burial of persons who die of infectious diseases were considered, and it was

Resolved, That the Secretary is hereby directed to prepare a circular with regard to public funerals, to be sent to clergymen, physicians, undertakers and school officers.

The report of the committee on public institutions was referred back, for completion by the first of January.

The committee on drainage and topography reported progress in the investigation of swamp drainage in the western part of the State.

The prevalence of small-pox and the mode of its spread came under consideration of the Board. It was

Resolved, That this Board views with great apprehension the wide spread of small-pox contagion along the routes of travel from the Atlantic to the Pacific, and in numerous manufacturing towns in several States;

Resolved, That this Board earnestly requests all health authorities and others, who know of the outbreak or presence of small-pox in any place in the State, to immediately report the fact to the Secretary of the State Board of Health, and to the nearest health officer; and the State Board's Secretary is required promptly to notify the local sanitary authorities and others who are responsible in every place where small-pox or varioloid is known or believed to be present, concerning the action which public safety and the laws require to be taken by them, and to offer such information as will enable them to procure the vaccinal protection with full effect and from best sources. The Board directs its Secretary to furnish to the health officer and board of health of every place where there is small-pox, all necessary instruction and aid for the most speedy and effective control and extinction of the contagion, and to supply the proper forms for the records and reports required under the new State laws.

Resolved, That the Attorney-General be consulted with a view to prepare such amendments of existing laws as may be necessary for the efficiency of the local boards of health throughout the State.

First Quarterly Meeting, Albany, *February* 8, 1882.

The Secretary gave notice that the annual report had been perfected according to the Board's direction and placed in the Governor's hands, and had been transmitted by him to the Legislature.

The chairman of the committee on drainage, sewerage and topography presented a supplementary report on the separate system of sewerage with daily flushing. The Board adopted the following:

Whereas, Many cases of disease directly traceable to contamination of water and earth by the soakage from privies and cess-pools have come within the knowledge of this Board; and

Whereas, Disease from this cause will continue to increase more and more rapidly unless action is taken to avert the evil; therefore be it

Resolved, by the State Board of Health:

1. That the use of privy-pits and cess-pools is seriously affecting the public health.

2. That all excreta should be removed from the neighborhood of human dwellings instead of being stored up near them in pits, vaults or pools to poison the water, earth and air.

3. That in villages and cities this removal of excreta should be done by the local authorities who shall be responsible for its proper performance, and in isolated localities by the individuals interested.

4. That this removal of excreta may be cheaply and healthfully done either by "dry-removal" or by water carriage.

5. That we recommend the method of "dry-removal," called the "tub or pail system," as the best for villages, hamlets, and isolated dwellings which are without water supply or have not the means to build sewers.

6. That towns having proper water supply should be provided with a system of small sewers adapted to carry only sewage, including excreta, slops, and waste-water, and excluding storm-water, which should be taken care of separately.

7. That the costly plan of large "combined sewers" for carrying sewage and storm-water together has proved a sanitary failure, both in England and in this country; while the "separate system," when properly constructed, avoids in great measure the evils from sewer air, now so common, and is much less expensive for most towns.

8. That the "separate system of sewers" with flush tanks is hereby recommended for general use in this State.

The Secretary called attention to the importance of having the State institutions make returns of their vital statistics directly to the State Board of Health. It was

Resolved, That the State Board of Health hereby directs the Secretary to supply blank forms for the records of mortality and permits for burial to the several State institutions, with the request that they make returns directly to this Board as well as to the proper local board.

Health Officer Gerin, of Auburn, appeared personally and made explanations concerning a nuisance caused by the obstruction of Owasco river through the old State dam, and asked the intervention of the Board to aid in its removal.

On motion, the subject was referred to the committee on drainage, sewerage and topography with power.

The committee on New Jersey stench nuisance upon the Kill von Kull reported the result of their inspection in connection with the State Board of Health, of New Jersey.

Health Officer Dr. Wm. M. Smith called attention to the necessity for an additional rule in reference to examining persons arriving from foreign ports as to their protection against small-pox, authorizing the detention of unprotected persons until such protection is secured by vaccination. The Health Officer was empowered to detain vessels and passengers where disease was found on board the ship; but he wanted authority to take care of such passengers as refused to be examined or vaccinated. The question was: Who would defray their expenses while detained? The National Board of Health would assume the necessary expense of securing vaccination, but no provision was made for subsistence. It would be unjust as well as expensive to detain all for the disobedience of the few who might resist. The consignees would rebel against the imposition of any tax upon them for such subsistence unless there was disease on board. It was

Resolved, If thought to be necessary, that the suggestions of Dr. Smith, Health Officer of the port of New York, for an additional rule for the protection of the people against the introduction of small-pox, be approved by the State Board, and sent to the National Board of Health with a recommendation for its approval and support.

The Secretary presented official communications from the National Board of Health setting forth the readiness of the Board to undertake the necessary expenses that may be incurred in the maintenance of a system of sanitary inspection of immigrants en route in or through the State of New York, with reference to the prevention of the spread of the contagion of small-pox and other diseases. The plan to which this offer of aid relates being that which was proposed by this Board at its meeting in June last, namely, the inspection of immigrants at certain stations of their railway transportation. The Secretary stated that facilities for refuge or hospital care for persons infected with small-pox already exist at East Buffalo, and were in process of preparation by the authorities of the town of Niagara, a mile or two east of Suspension Bridge; that similar facilities were available at Hornellsville, Salamanca and Dunkirk. Health Officer Smith and Commissioner Stephen Smith, of the National Board of Health, were well agreed upon this general plan, and the latter submitted and requested the adoption of the provisions of circular No. 7, of June, 1879. The subject had taken form as directed by a voluntary conference between Commissioner Brooks, the Secretary of the State Board of Health, and Health Officer Smith, with the chairman of the quarantine committee of the National Board of Health, held in New York, January 21. The National Board undertakes to pay all expenses at a given rate approved by it. That the appointments and entire control of the duties are to remain under the State Board's direction.

The National Board requests that the State Board shall adopt in a formal way the rules and regulations of the National Board of Health in reference to such relationships between it and the State Board, and also be prepared to give a certificate, or cause it to be given, showing that the State has no funds available for these expenses as advised to be made. Circular No. 7 was submitted as requested by the National Board. It was

Resolved, That so far as the provisions of circular No. 7, June, 1879, National Board of Health, are applicable in this State in the relations which the State Board of Health and the State of New York now sustain, or may at any time hereafter sustain, to the National Board of Health, they are hereby approved and adopted by this Board.

Resolved, That the subject of appointments and organization of duties which are contemplated for the protection of immigrants and of the State of New York be, and is referred to the President and Secretary of the Board with power to act for the Board.

The Secretary also submitted report of Emil Kuichling, C. E., on the Genesee Valley canal-bed drainage. It was

Resolved, That the Secretary be authorized to request the Commissioner of Public Works to complete the drainage works referred to, so far as such works lie in districts beyond the canal railroad property.

The Secretary called attention to the requests from Auburn and various other places for the Board's advice in reference to school buildings about to be erected, and the propriety of sending Dr. Lincoln to these places to give the counsel desired. The following preamble and resolution were adopted:

WHEREAS, School officers of numerous districts in the State have applied to the State Board of Health for suggestions concerning the proper sanitary arrangements for school-houses, therefore,

Resolved, That the conclusions derived from the report of the standing committee on public institutions, as regards school hygiene, together with the recommendations in Dr. Lincoln's special report on the subject, are hereby adopted by this Board, and ordered to be reprinted from the annual report for distribution to school commissioners and the proper school officers.

The Secretary called attention to the successful plan of vaccination that had been carried out in Rochester, and suggested the value of getting a report from the health commissioners of that city on the subject.

QUARTERLY MEETING, AT ALBANY, *May* 9, 1882.

The standing committee on laws report the progress of the proposed amendment to section 8, chapter 322 of the organic law of the Board, re-defining the powers, and giving greater facility to the action, of the Governor by executive orders; also the progress of the proposed amendment of the General Health Act of 1850 and 1881.

The Attorney-General gave it as his opinion, that under section 7 of chapter 322, or the organic law of the Board, the general supervision over the whole subject of registration, the regulation of the books of record, and the amendment, alterations or corrections to be permitted

in them, has been placed under this Board. He would be willing to maintain the affirmative of this proposition should the question come before the courts.

The chairman of the sanitary committee presented a supplementary report on sugars. He recommended that this Board should pursue the plan which has been adopted in England and in Canada for publicly exposing frauds and falsifications in foods and drugs; the chief feature of the plan being the publication of the analysis of the fraudulent articles, the names of the manufacturers and their products. It was

Resolved, That the whole subject be recommitted to the sanitary committee, with instructions that the expenditures be limited to $3,500 for the coming year.

Resolved, That Dr. Samuel A. Lattimore, of Rochester, Dr. Willis G. Tucker, of Albany, and Drs. Frederick Hoffmann and E. G. Love, of New York, be appointed public analysts to serve one year at a compensation of $750, to make such analysis of food and drugs as may be assigned to them by the sanitary committee.

Resolved, That the sanitary committee be authorized to expend a sum not to exceed $500 in securing samples for analysis.

Resolved, That so much of water analysis as is required by this Board during the coming year be referred to the several chemists appointed, who are to be paid at the rate of ten dollars per sample analyzed; the analysis to be made on the recommendation of the local boards of health, the local boards being requested to defray the attendant expenses.

The committee on quarantine made a supplementary report on the work of the New York quarantine, particularly in reference to small-pox and the aid that should be extended to the Health Officer of the port by the National Board of Health in the examination and inspection of emigrants at quarantine. He desired the National Board to pay for a special assistant in the work to be selected by, and under the direction of, the Health Officer. It was

Resolved, That in view of the vast numbers of immigrants entering our country through the port and State of New York, and the labor involved in vaccinating and protecting them and the people of the United States against small-pox, the State Boaad of Health of New York hereby recommends that the Health Officer of the port of New York should be assisted by the National Board of Health in defraying such unusual expenses as are incidental to the examination of emigrant passengers and the vaccination of insufficiently protected persons arriving at said port.

And if, in the opinion of the Health Officer of the port of New York, and of the President and Secretary of this Board it is necessary to establish, temporarily, an inspection of emigrant passengers on emigrant trains en route through the State, at Hornellsville and at Rochester, for further safeguards against contagion, said officers are hereby authorized to request assistance from said National Board of Health, and to have charge of such temporary service.

Resolved, That the committee on drainage, sewerage and topography have authority to engage the services of Emil Kuichling, C. E., at the rate of $170 per month, for such time as in their judgment is neces-

sary for the work of the Board, and under such instructions as may be given to this Board by the Attorney-General, concerning such engagement.*

The Secretary reported that some important drainage work remained to be executed at certain points along the abandoned canals in Chemung, Schuyler and Livingston counties. There was money enough remaining from last year's appropriation for this purpose to complete the work. It was

Resolved, That the Superintendent of Public Works is hereby requested to complete the execution of the drainage works which, in the judgment of this Board, need to be finished on the two abandoned canals where the labor was interrupted last summer.

The subject of having in each town and village in the State a suitable infectious disease refuge and hospital to which infected persons and cases of contagious disease could be sent, was considered, and the Secretary was instructed to have the most suitable plans and specifications for such refuge-hospitals published and distributed in circular form.

SPECIAL MEETING, HELD IN NEW YORK, *June* 22, 1882.

The duties imposed upon the Board by chapter 292 of the Laws of 1882 were discussed, and reported upon. It was decided that a thousand dollars of the five thousand appropriated by the Legislature should be reserved for contingent expenses, the provision of apparatus, etc. The law was considered as just and lenient as regards the standards it fixes. The Board directed its Secretary to prepare and issue an official notification to the public that this law would go into effect on the 9th of August. It was

Resolved, That the sanitary committee be requested after consultation with the public analysts to report as soon as possible to the Secretary the proper tests and instruments to be used in accordance with the provisions of chapter 292, Laws of 1882, entitled "An act to regulate the standard of illuminating oils," etc.

Resolved, That the Secretary be directed to call a meeting of the Board as soon as such report is received.

Professor Chandler suggested that the Secretary be authorized to print three thousand copies of chapter 292, Laws of 1882, for distribution.

The Secretary explained that it was ready to be added to Dr. Elliott's pamphlet, and that the printer had offered to print an edition of the pamphlet containing forty-six pages for $41.45. It was

Resolved, That the Secretary be authorized to print two thousand copies of the pamphlet, with chapter 292, Laws of 1882, added.

The Secretary reported the progress made in the drainage work along the line of the abandoned canals, which had been interfered with by certain land-owners. The town boards of health along twelve sections of the canal had held meetings and secured concessions for the outflow of water between lands which had obstructed the drainage last fall.

The Secretary also reported the progress of sewerage work in the city

* The Attorney-General decided that the organic law of the Board does not permit such appointment with salary, and that the compensation must be *per diem*, etc.

of Hudson, and the acceptance by the city authorities of the advice given through the engineer sent to counsel with them by the Board.

Mr. Brooks called attention to the increasing nuisance on the Kill von Kull, caused by offensive businesses carried on in New Jersey, and urged that every means within the power of the Board be exhausted to procure an abatement. It was

Resolved, That the committee on effluvium nuisances be authorized to employ a person to trace the nuisances to their sources with a view to laying the facts before the grand jury of Richmond county.

Several complaints in reference to nuisances at Hunter's Point and on Newtown creek were presented and referred to the special committee.

Professor Chandler said the foreman of the grand jury had sent for him to obtain a statement of the present condition of these nuisances. He requested him to say to the State Board of Health, that if the grand jury could do any thing to abate these nuisances, they were ready to do so. It was

Resolved, That the committee on effluvium nuisances be authorized to cause an inspection to be made at once of Newtown creek and the establishments there in order that a report may be presented to the grand jury in response to their request for a statement of the present condition of nuisances there.

On motion, it was

Resolved, That in view of the importance of exactness in the reports and the preservation of correct records of prevalent diseases, all local boards of health, of cities, villages and towns alike, are advised to cause their health officers to prepare and keep for reference outline maps, which shall be known as "sanitary maps," and that the Secretary of this Board be instructed to aid in preparing such maps without expense to the Board.

QUARTERLY MEETING, HELD AT SARATOGA SPRINGS, *August* 9, 1882.

The committee on effluvium nuisances reported, that in obedience to instructions from the Board at a former meeting, the Hunter's Point district had been reinspected and recently reported upon by Mr. Colby. The report shows that whatever nuisance exists there at present is the result of carelessness, and that, as far as offense to New York is concerned, the chief nuisances are abated. But as long as any waste materials of the refineries and manufactories was allowed to discharge into Newtown creek, there would be more or less nuisance.

The chairman of the committee also reported the progress made in dealing with the nuisance opposite to, and from the Bayonne oil refineries; and the committee recommended that the effort to secure its suppression be continued.

Commissioner Brooks stated that a report on the subject, by Dr. Wm. C. Walser, health officer of New Brighton had been prepared for the Board. The report is as follows:

PORT RICHMOND, S. I., *August* 8, 1882.

Hon. ERASTUS BROOKS, AND COMMITTEE ON EFFLUVIUM NUISANCES,
State Board of Health:

GENTLEMEN — I have this day made an inspection of the manufactories on Constable Hook, N. J., opposite New Brighton and Port Richmond, in company with Dr. Brush, health officer of Bayonne City, N. J., and Mr. Hollick of the New York health department, and now report as follows:

The following establishments were visited, and as carefully examined as circumstances would permit, viz.: Copper Smelting Works, French Oil Works, Reynold's Varnish and Paint Works, Osgood's Zinc Works, Bergen Point Chemical Works, White's Sulphur Works, Standard Oil Refineries, Kalbfleiche's Chemical Works, and the Ocean Oil Company's Refining Works, and the Petroleum Refinery, owned by Lombard & Ayers.

The only nuisance caused by the three first-mentioned places is from Reynolds' works, where the chimneys are cleansed by burning out occasionally. This does not occur more than three or four times a year.

Osgood's works are constantly emitting sulphurous acid fumes from their ore-roasting furnaces, which could be easily prevented, and the fumes utilized in the manufacture of sulphuric acid.

The escape of fumes from the Bergen Point Chemical Works seems to be due to leaks in the stills, and not to fumes emitted from the chimneys.

The Standard Oil Works were next visited, and here every thing seems to be done that is possible to avoid all escape of noxious substances, yet a great deal of waste seems unavoidable.

No nuisance whatever could be detected from Kalbfleiche's acid factories.

Sludge acid and oil drippings seem to have accumulated around Lombard, Ayers & Company's and the Ocean Oil Works. The latter company has built its tanks and agitators over the marsh-meadows, where the tide readily carries off all waste, and transports it along the adjacent shores. More or less waste and dripping seem inevitable, and the best temporary remedy would be to enforce a thorough system of bulk-heads and dams along the entire water-front, and filling in behind the same, thereby preventing the wash, etc., from coming in contact with the tide-water.

The tanks of Lombard, Ayers & Company were leaking badly and saturating the ground, besides escaping in quantities into the creek adjoining. The chimneys of the furnaces of the same company were emitting quantities of black smoke, which could be obviated by a proper system of smoke-burners and fire-bed blowers, and by prohibiting the burning of the residuary tar from the tanks.

In order to trace the different nuisances to their exact sources it would be necessary to keep a constant watch upon these various works, particularly at low tide, when all refuse that escapes could be easily traced.

All the companies profess entire willingness to comply with whatever is requisite to render their respective works as perfect as possible,

in a sanitary point of view; now, each one tries to fasten the responsibility on the other. I also think greater care might be taken in loading of boats with sludge acid, preparatory to transportation, as a very little acid and oil waste will spread over a large expanse of water.

Respectfully submitted,

(Signed) W. C. WALSER, M. D.,
Health Officer, Northfield.

The Secretary reported for the drainage committee, concerning the continued nuisance in New Rochelle, and explained that the means for its abatement had been fully reported upon by the committee and its engineer last fall. That nuisance is caused by the discharge of the sewage of a great brewery into Burling brook for a mile and a quarter through a rocky region, along the eastern border of the village. The Governor's order had remained uncomplied with. The Governor recently directed the Board to make a reëxamination of the nuisance.

The Secretary read a letter from Mr. Robert Jaffreys of the Bank of America, to the Governor, on the subject.

After consideration it was

Resolved, That it is earnestly recommended to the trustees of the estate known as that of David Jones and the New Rochelle brewery, to connect the brewery property with New Rochelle bay by a separate and tubular sewer.

Resolved, That this subject be referred back to the committee on drainage, sewerage and topography, for immediate inspection, and report to the Governor.

The papers officially referred to the Board by the Governor, relating to nuisance upon the Nepperhan river in the city of Yonkers, were submitted; and it was

Resolved, That the papers relating to the nuisance at Yonkers are hereby referred to the committee on drainage, sewerage and topography, for inspection, with instruction to report results to the Governor as soon as practicable.

The petition and papers from the city of Lockport asking the Governor to require the State Board of Health immediately to examine into a public nuisance, said to be caused by the defilement of the Erie canal in the city of Buffalo, by glucose washings and other waste matters, was considered. The feasibility of abating the nuisance by passing the washings from the glucoseries through mechanico-chemical filtering beds before reaching the canal, was discussed. It was

Resolved, That the Board hereby directs its sanitary committee to unite with the committee on drainage, sewerage and topography in an immediate investigation of the sources of the nuisance complained of, and that their recommendations be made to the Governor in the name of the Board as soon as practicable.

The Secretary reported that the Tonawanda nuisance is simply a continuation of this, and that the Hamburgh street canal nuisance of Buffalo is but the beginning of the nuisance at Tonawanda and Lockport.

The papers last received from the Governor relating to the causes of malarial nuisance in Schaghticoke were submitted. The Secretary stated that in a recent visit with sanitary experts from Albany and

Boston, he ascertained that the malarial district had extended a mile or more beyond its limits the previous year, southward and eastward. An effort was now being put forth with a view to securing an abatement of the nuisance in a manner satisfactory to all concerned. It was

Resolved, That the committee on drainage, sewerage and topography shall at once renew its report to the Governor, after reinspection of the district.

A petition from citizens of Utica was submitted, asking for the abatement of a nuisance in the "gulf" between Elizabeth street and the Erie canal in that city. It is caused by the backing up of water from the Erie canal, causing a stagnant basin. The basin is used as a canal feeder, and the city drains into it. Legislation had been sought in vain, last session, for a remedy of the evil. The property belongs to the State. It was

Resolved, That the petition be referred to the committee on drainage, with instructions to present the subject to the Superintendent of Public Works and to the Governor.

The Secretary reported the conclusions of Engineer Kuichling upon drainage of the bed of the late Genesee Valley canal. The objections made by the property owners adjacent to the canal are all withdrawn. The drainage is reported practically completed, and the Department of Public Works reports that there is enough money remaining, after finishing the work on the Chemung canal, to complete the drainage upon all that remains of the State property of the abandoned Genesee Valley canal. He recommended that the Superintendent of Public Works be urged to apply, as far as he can lawfully do so, the means at his disposal for the relief of the nuisance complained of near the terminus of the old canal at Dansville.

Health Officer Dr. Wm. M. Smith reported upon the sanitary protection of emigrants by obligatory vaccination as a condition precedent to their departure from foreign ports, or of landing at the port of New York. He reported that this sanitary service had become so complete as to amount to an almost total suppression of small-pox by emigrants.

The chairman of the sanitary committee, in compliance with the order of the Board at a previous meeting, reported upon the nature of tests and the instruments to be adopted by the Board in giving effect to the law relating to the standards and safety-testing of illuminating oils. The Board adopted the report, and directed that the supervision of this work, under chapter 292 of 1882, be intrusted to the sanitary committee. It was

Resolved, That, as compensation for the duties imposed upon the public analysts by chapter 292 of 1882, the sum of $83.33 per month be allowed to each analyst during the pleasure of the Board.

Resolved, That the State Board of Health hereby recommends and requests all local boards of health in the State of New York, fire marshals, insurance companies and town and village authorities to give notice promptly to this Board of any violation of the law known as chapter 292 of 1882, relating to explosive illuminating oils, within their observation or knowledge.

Resolved, That the report of the sanitary committee for rules and

regulations in the administration of chapter 292 of 1882 be printed for public distribution.

Resolved, That at the discretion of the committee on registration the Secretary shall cause such samples of polluted water to be sent to the nearest of the Board's analysts, within a limit not to exceed twenty samples during the coming six months, to be examined as provided for, at $10 per sample.

QUARTERLY MEETING HELD AT ALBANY, *November* 18, 1882.

The Attorney-General reported favorably upon the Board's using in its official work whatever funds the Legislature had appropriated for its use.

The Secretary, for the committee on drainage and topography, reported that about fifty-five miles length of the late abandoned canals in the Genesee and Chemung regions, had been completed as ordered by the Governor and as otherwise provided by order of the Legislature; also that the Board's report upon the Nepperhan nuisance at Yonkers was placed in the hands of the Governor.

The saw-dust nuisances as complained of in the public waters of the State at various places were reported upon, and it was

Resolved, That the reports on the saw-dust nuisance, accompanied by the engineer's notes, with the facts thus far submitted to the Board, be referred to the Attorney-General for advice; and that he be requested to prepare a suitable outline or amendment of law for presentation to the Legislature, with a view to removing the evils complained of.

The report of the inspections and of the chemical investigations relating to nuisances caused by the glucoseries and starch factories in Buffalo, by their waste outflowings into the Hamburgh street and Main canal, was discussed, and the following resolutions were adopted:

Resolved, That in the opinion of the Board, the discharging of refuse laden with organic matter into the Hamburgh street and Main canals, is a source of danger, not only to the citizens of Buffalo, but to the residents along the line of the Erie canal as far as Lockport.

Resolved, That after a careful examination of the works at Buffalo by joint committees of this Board, and the chemical analysis of the various kinds of refuse, it is the opinion of the State Board of Health that the pollution of this water by these factories is entirely unnecessary to the carrying on of their business, and may be completely obviated without in any way interfering with it.

Resolved, That a copy of the above resolutions be sent to each of the factories, and to the various local authorities concerned.

A communication was received from the Association for Improving the Condition of the Poor, in New York, urging attention to the filthy streets of that city, also complaining that Hunter's Point is still offensive to the senses.

The communication embodied a copy of the following minute: "On motion, it was voted that the Secretary make an official communication to the Secretary of the State Board of Health, at Albany, New York, of the present condition of the streets of New York city,

and also of the combined nuisances prevailing at Hunter's Point, Long Island, and to proffer the aid of this association in the efforts of the State Board of Health to secure a better condition of our streets and the abatement of evils arising from the foul odors coming from Hunter's Point."

The Attorney-General, as chairman of the law committee, advised, that the local authorities of New York should be held responsible for the streets and their cleaning; but that as regards the Governor's orders, already issued, for the abatement and permanent prevention of nuisances at Hunter's Point the orders would necessarily continue in force until all the nuisances specified in those orders are overcome and prevented. Therefore, it will be expedient for the State Board to keep up any necessary inquisition and notification to secure perpetual compliance with those orders. On motion, it was

Resolved, That Inspector Albert L. Colby be instructed to report, once in each month, to the Secretary the condition of each one of the oil refineries and other factories and places in the neighborhood of Newtown creek which is liable to produce offensive effluvia.

Resolved, That in case it appears from the report of Inspector Colby that any one of the establishments in that neighborhood neglects to properly care for its refuse gases, and other material whereby nuisance is created, the Secretary shall immediately communicate the fact to the offending parties.

The sanitary committee reported that since the last quarterly meeting ten samples of drinking water had been examined by the public analysts at the request of the local board or of health authorities, most of which had been found to be unwholesome.

The sanitary committee also reported that since the last quarterly meeting, the following work had been performed under chapter 292, 1882: Three kerosene accidents had been investigated by Inspector Colby, two of which resulted in loss of life. All were caused by oil which was found to be below the legal standard of the State. Of six samples of oil purchased in Buffalo, four were below standard. Of fifteen samples purchased in Batavia, none were up to the State test, all being dangerous. Of six samples purchased in Syracuse, only one was up to the standard. Of ten samples purchased in Rome, all were bad. Of the 145 samples purchased at 123 stores in Brooklyn, only five were up to the legal standard, twenty-two samples emitted combustible vapors at ordinary temperatures. The committee also reported that Mr. J. N. Partridge, fire commissioner of Brooklyn, had adopted the instrument fixed by the State Board of Health, and would prosecute all offenders in future. The law was now uniform for all parts of the State, except in New York city. The charter of the city directs the fire commissioners to fix the standards which shall be used in testing oils. If the State instrument was adopted by them, the entire State would be secured the same protection from dangerous kerosene that is enjoyed by the citizens of Michigan, Ohio, Indiana, Illinois, Iowa, Missouri and Tennessee, where the same standard has been adopted. The following preamble and resolution were adopted:

WHEREAS, According to the provisions of chapter 292 of 1882, the standard safety-test for kerosene oil throughout the State of New York, with the exception of New York city, has been fixed by the adoption of an instrument by the State Board of Health, which es-

tablishes a standard of quality for oil which may be legally sold, similar to that which exists in Ohio, Indiana, Illinois, Michigan, Iowa, Missouri and Tennessee; and

WHEREAS, According to law, it is in the power of the fire commissioners of the city of New York to adopt the instrument approved by the State Board of Health, as has been already done by the fire commissioners of Brooklyn, and thus secure complete uniformity throughout the entire State in the legal standard of kerosene oil, therefore

Resolved, That the fire commissioners of New York city be respectfully requested to take this matter into consideration with a view to the adoption of the State Board's approved tester.

The sanitary committee also reported that since the last quarterly meeting sixty-seven samples of drugs and medicines and one hundred and eighty-eight samples of food had been purchased. Of these, fifty-nine samples of drugs had been examined by the public analysts, and nineteen were found adulterated or impure; fifty-seven samples of food had been examined and twenty were found to be adulterated. The other samples were still in the analysts' hands. The committee also reported that evidence was ready to prosecute offenses against chapter 407 of 1881, in the case of four samples of drugs, one of arrowroot, three of coffee, and seventeen of cream of tartar. On motion, it was

Resolved, That the sanitary committee be authorized to expend a sum not exceeding $500 in prosecuting certain cases of violation of chapter 407 of 1881, and chapter 292 of 1882. The amount to be charged equally to the funds appropriated under each act.

The propriety of amending the law so as to provide for such fines and penalties as would enable the Board to defray the costs of prosecutions where necessary, was discussed. It was

Resolved, That the subject be referred to the Attorney-General with the request that he prepare a suitable amendment of law to cover the subject.

The following preambles and resolution were also adopted:

WHEREAS, The adulteration of milk is extensively practiced in every part of the State; and

WHEREAS, There is no article of food, the adulteration of which is liable to produce such serious consequences; and

WHEREAS, The perishable nature of milk makes it impossible for the State Board through its inspector and public analysts to take charge of this subject, therefore,

Resolved, That the attention of local boards of health be called to this subject in the hope that some system of inspection may be adopted by them to remedy the existing evil.

The chairman of the sanitary committee called attention to the necessity of making a change in the districts assigned to the public analysts so as to secure greater convenience for travel by the lines of railway. The following are districts proposed:*

The western district to include the counties of Oswego, Onondaga, Cayuga, Tompkins, Tioga, and all counties west of these.

The southern district to include Sullivan, Ulster, Dutchess, and all the counties south of these.

The north-eastern or central district to include all the other counties.

*At a later date the Board arranged for this service in four districts, viz.; The Metropolitan, North-eastern, Southern Tier and Western.

On motion, the chairman of the sanitary committee was authorized to make such change.

The Secretary called attention to the subject of the third annual report, and the necessity of having it ready within the first ten days of January. On motion, it was

Resolved, That the chairmen of the respective standing committees and of the special committees be requested to have their reports complete for the press and in readiness for presentation at the January meeting of the Board.

On motion, it was

Resolved, That the Secretary be authorized to have an edition of five hundred copies of the report on Water Analysis printed separately.

[A.]

REPORT OF THE EXECUTIVE AND FINANCE COMMITTEE.

Statement of warrants drawn by the Comptroller on account of the State Board of Health of New York, for the year from September 30, 1881, to September 30, 1882:

Printing and Stationery.

1882.	Jan.	21.	E. H. Bender, per account	$1 20
	Feb.	4.	R. K. Quayle, per account	27 00
		25.	Van Benthuysen & Sons, per account	539 71
	May	4.	Van Benthuysen & Sons, per account	242 75
	July	25.	Van Benthuysen & Sons, per account	83 55
		25.	R. K. Quayle, per account	12 00
	Sept.	30.	Comptroller's account to September 30	295 57
				$1,201 78

Postage and Expressage.

1881.	Oct.	11.	Postage stamps	$130 00
	Nov.	22.	Postage stamps	46 00
1882.	Feb.	7.	Postage stamps	80 00
	Mar.	10.	Postage stamps	30 00
	May	10.	Postage stamps	100 00
	June	16.	Postage stamps	30 00
	July	25.	Postage stamps	50 00
	Aug.	22.	Postage stamps	60 00
		22.	Postage stamps	50 00
				$576 00

Scientific and Expert Services.

1881.	Oct.	15.	Prof. Elwyn Waller, water analysis, per account	$164 80
	Nov.	2.	A. L. Colby, special inspection of Kings and Queens counties	61 25
		10.	Dr. D. F. Lincoln, school-house inspection, per account	259 26
		15.	A. L. Colby, inspections, per account	14 19
	Dec.	2.	E. Kuichling, C. E., inspections and report on Tonawanda and Oak Orchard swamps	74 59

1881. Dec.	2.	Dr. D. F. Lincoln, school-house inspection, per account	$300 73
	6.	A. H. Elliott, investigations in testing petroleum, per account	153 45
	16.	John Kerr, inspections in Kings and Queens counties	95 10
	31.	Dr. D. F. Lincoln, school-house inspections, per account	271 46
	31.	Dr. J. S. Cooley, investigating diphtheria in Warren county	24 65
1882. Jan.	16.	Dr. L. J. Ames, sanitary inspections of drainage district, Genesee Valley canal	42 00
	16.	L. W. Pratt, clerical service, per account	48 00
Feb.	10.	Dr. Geo. M. Beard, sanitary inspecting in Chemung and Schuyler counties	129 45
	10.	Dr. E. Waller, water analyses, per account	155 62
	10.	A. H. Elliott, services on petroleum tests, per account	150 00
	10.	A. L. Colby, inspections at Hunter's Point, per account	75 06
Mar.	8.	A. L. Carroll, M. D., sanitary inspections, per account	38 00
	15.	J. J. R. Croes, C. E., report on New Rochelle nuisance	11 20
Apr.	4.	E. Kuichling, C. E., report on Perrinton and Auburn nuisance	60 30
May	5.	E. Kuichling, C.E., report on Fairport nuisances	26 02
May	15.	Dr. D. F. Lincoln, school inspections, per account	95 93
June	21.	E. Kuichling, C. E., inspection and services at Batavia and Dansville	40 56
	21.	Dr. P. B. Porter, expenses on duty at Southampton	4 34
	21.	A. L. Colby, inspections of effluvium nuisances	26 79
	21.	E. Kuichling, C. E., inspections at Hudson and elsewhere, per account	117 60
July	12.	Prof. Richard Prescott, M. E., draughting and estimates for disease refuges	40 00
Aug.	11.	E. Kuichling, C. E., inspections and reports, per account	60 43
	11.	Dr. F. C. Curtis, sanitary inspections of typhus fever, West Shore Railroad lodging	71 15
Sept.	16.	E. Kuichling, C. E., inspections at Buffalo, Tonawanda and Lockport	25 17
	19.	Dr. W. C. Walser, sanitary inspection of Kill-von-Kull	17 00
	19.	A. L. Colby, inspections of nuisances, per account	67 17
	19.	Frederick Carman, expenses attending meetings of Board	7 30
			$2,728 57

Salaries and Wages.

1881. Nov.	1.	Dr. Elisha Harris, Secretary, salary, October	$250 00
	1.	Frederick Carman, stenographer and correspondence clerk	150 00
	1.	Robert Nelson, registry and account clerk	100 00
	1.	Fergus Halpen, office boy and messenger	15 16

1881. Dec.	2.	Dr. Elisha Harris, Secretary, November	$250 00
	2.	Frederick Carman, stenographer and correspondence clerk	150 00
	2.	Robert Nelson, registry and account clerk	100 00
	2.	Fergus Halpen, office boy and messenger	15 16
	29.	Dr. Elisha Harris, Secretary, December	250 00
	29.	Frederick Carman, stenographer and correspondence clerk	150 00
	29.	Robert Nelson, registry and account clerk	100 00
	29.	Fergus Halpen, office boy and messenger	15 16
1882. Feb.	1.	Dr. Elisha Harris, Secretary, January	250 00
	1.	Frederick Carman, stenographer and correspondence clerk	150 00
	1.	Robert Nelson, registry and account clerk	100 00
	1.	Fergus Halpen, office boy and messenger	15 16
Mar.	1.	Dr. Elisha Harris, Secretary, February	250 00
	1.	Frederick Carman, stenographer and correspondence clerk	150 00
	1.	Robert Nelson, registry and account clerk	100 00
	1.	Dr. Geo. F. Brooks, mortality registry clerk	50 00
	1.	L. W. Pratt, clerical services	108 00
	1.	Fergus Halpen, office boy and messenger	15 16
	31.	Dr. Elisha Harris, Secretary	250 00
	31.	Frederick Carman, stenographer and correspondence clerk	150 00
	31.	Robert Nelson, registry and account clerk	100 00
	31.	Dr. Geo. F. Brooks, mortality registry clerk	100 00
	31.	L. W. Pratt, clerical services	108 00
	31.	Fergus Halpen, office boy and messenger	15 16
Apr.	29.	Dr. Elisha Harris, Secretary, April	250 00
	29.	Frederick Carman, stenographer and correspondence clerk	150 00
	29.	Robert Nelson, registry and account clerk	100 00
	29.	Dr. Geo. F. Boooks, mortality registry clerk	100 00
	29.	L. W. Pratt, clerical services	12 00
	29.	Fergus Halpen, office boy and messenger	15 16
June	1.	Dr. Elisha Harris, Secretary, May	250 00
	1.	Frederick Carman, stenographer and correspondence clerk	150 00
	1.	Robert Nelson, registry and account clerk	100 00
	1.	Dr. Geo. F. Brooks, mortality registry clerk	100 00
	1.	Fergus Halpen, office boy and messenger	18 00
July	1.	Dr. Elisha Harris, Secretary	250 00
	1.	Frederick Carman, stenographer and correspondence clerk	150 00
	1.	Robert Nelson, registry and account clerk	125 00
	1.	Dr. Geo. F. Brooks, mortality registry clerk	100 00
	1.	L. W. Pratt, clerical services	50 00
	1.	Fergus Halpen, office boy and messenger	18 00
Aug.	1.	Dr. Elisha Harris, Secretary, July	250 00
	1.	Frederick Carman, stenographer, and correspondence clerk	150 00
	1.	Robert Nelson, registry and account clerk	125 00
	1.	Dr. George F. Brooks, mortality registry clerk	100 00
	1.	L. W. Pratt, clerical services	48 00
	1.	Fergus Halpen, office boy and messenger	18 00
	31.	Dr. Elisha Harris, Secretary, August	250 00
	31.	Frederick Carman, stenographer and correspondence clerk	150 00

1882. Aug.	31.	Robert Nelson, registry and account clerk	$125 00
	31.	Dr. George F. Brooks, mortality registry clerk	100 00
	31.	L. W. Pratt, clerical services	100 00
	31.	Fergus Halpen, office boy and messenger	18 00
Sept.	30.	Dr. Elisha Harris, Secretary, September	250 00
	30.	Frederick Carman, stenographer and correspondence clerk	150 00
	30.	Robert Nelson, registry and account clerk	125 00
	30.	Dr. George F. Brooks, mortality registry clerk	100 00
	30.	Fergus Halpen, office boy and messenger	18 00
			$7,472 12

Traveling and Other Necessary Expenses of Members.

1881. Nov.	11.	Dr. J. Savage Delavan, per account	$23 20
	16.	Dr. William M. Smith, per account	13 95
	21.	Erastus Brooks, per account	33 90
Dec.	9.	Dr. Elisha Harris, per account	198 69
	13.	Dr. J. Savage Delavan, per account	18 13
	13.	Dr. James G. Hunt, per account	30 00
	13.	Prof. Charles F. Chandler, per account	89 23
	29.	Erastus Brooks, per account	96 90
Feb.	1.	Dr. E. M. Moore, per account	30 88
June	24.	Dr. J. Savage Delavan, per account	15 70
July	15.	Dr. William M. Smith, per account	27 90
Aug.	31.	Erastus Brooks, per account	66 95
Sept.	8.	Dr. James G. Hunt, per account	65 17
	14.	Dr. William M. Smith, per account	19 30
	14.	Dr. E. M. Moore, per account	38 82
	14.	Erastus Brooks, per account	42 79
	14.	Dr. James G. Hunt, per account	7 50
	14.	Dr. J. Savage Delavan, per account	24 20
			$843 21

Library.

1882. Jan.	21.	Bender, for books	$9 50

Miscellaneous Expenses at Central Office.

Sept.	19.	Expenses, per itemized account	$86 92

Furniture.

Jan.	21.	E. Bender, per account	7 00
Mar.	21.	Westcott, chairs for Bureau	9 50
			$16 50
		Grand total	$12,934 60

Statement of Expenses under chapter 407 *of* 1881, *from January* 1, 1882, *to September* 30, 1882.

1882. Jan.	16.	Chas. E. Munsell, inspector, per account	$60 20
	16.	T. De Lap Smith, inspector, per account	70 60

1882. Jan. 18.	Westerman & Co., books, per account	$2 95
18.	E. G. Love, analyst, examination and report on foods, per account	400 00
Feb. 10.	Albert H. Chester, analyst, examination and report on foods, per account	403 93
25.	C. Van Benthuysen & Sons, printing, per account.	108 75
Mar. 7.	I. E. Englehardt, analyst, examination and report on beers, etc., per account	401 00
7.	Fred. Hoffmann, analyst, examination and report on drugs, per account	400 00
7.	S. A. Lattimore, analyst, examination and report on foods, per account	403 50
7.	G. Caldwell, analyst, examination and report on cheese, lard, etc., per account	401 70
7.	W. W. Pitt, analyst, examination and report on sugars, per account	413 00
20.	W. G. Tucker, analyst, examination and report on drugs, per account	400 00
20.	W. G. Tucker, analyst, for expenses, per account.	5 73
May 15.	A. L. Colby, inspector, per account	318 43
22.	The Sanitary Engineer, subscription, per account.	6 00
July 25.	S. A. Lattimore, analyst, expenses attending special meetings	21 78
Sept. 29.	Prof. Charles F. Chandler, for various supplies, per account	118 52
29.	A. L. Colby, inspector, per account	59 33
30.	E. G. Love, analyst, for services, per account	206 28
		$4,201 69

The above expenditures are classified as follows :

For traveling and incidental expenses of chemists and examiners.	$88 84
For compensation of chemists and inspectors	3,796 28
For printing and stationery	170 78
For purchases of samples for analysis	63 89
For library and literature for chemists and Board	9 95
For postage, expressage and telegrams	16 46
For chemical apparatus and supplies	55 49
	$4,201 69

Statement of Expenditures under chapter 292 *of* 1882, *to September* 30, 1882.

Sept. 30.	A. L. Colby, inspector, per account	$72 67
30.	E. G. Love, analyst, per account	141 66
		$214 33

The above expenditures are classified as follows :

For traveling expenses of inspector	86
For compensation of analyst and inspector	$208 33
For expressage	1 00
For purchase of samples for analysts	4 14
	$214 33

(B.)

REPORT OF THE SANITARY COMMITTEE.

I. Report upon the testing of illuminating oils, under chapter 292 of the Laws of 1882.

II. Report upon the examination of food and drugs, under chapter 407 of the Laws of 1881.

III. Report upon the chemical analysis of drinking water.

I. Illuminating Oils.

On June 6, an act was passed by the Legislature regulating the standard of illuminating oils, which is as follows:

Chap. 292, Laws of 1882.

An act to regulate the standard of illuminating oils and fluids for the better protection of life, health and property.

Section 1. No person, company or corporation shall manufacture or have in this State, or deal in, keep, sell or give away, for illuminating or heating purposes in lamps or stoves within this State, oil or burning fluid, whether the same be composed wholly or in part of naphtha, coal oil, petroleum or products manufactured therefrom, or of other substances or materials, which shall emit an inflammable vapor which will flash at a temperature below one hundred degrees by the Fahrenheit thermometer, according to the instrument and methods approved by the State Board of Health of New York.

§ 2. No oil or burning fluid, whether composed wholly or in part of coal oil and petroleum or their products, or other substance or material, which will ignite at a temperature below three hundred degrees by the Fahrenheit thermometer, shall be burned in any lamp, vessel or other stationary fixtures of any kind, or carried as freight in any passenger or baggage car, or passenger boat moved by steam power in this State, or in any stage or street car drawn by horses. Exceptions as regards the transportation of coal oil, petroleum and its products are hereby made when the same is securely packed in barrels or metallic packages, and permission is hereby granted for its carriage in passenger boats moved by steam power when there are no other public means of transportation. Any violation of this act shall be deemed a misdemeanor and subject the offending party or parties to a penalty not exceeding three hundred dollars, or imprisonment not exceeding six months, at the discretion of the court.

§ 3. It shall be the duty of the State Board of Health of New York to recommend and direct the nature of the test and instruments by which the illuminating oils, as hereby before described, shall be tested

in accordance with this act. It shall be the duty of the public analysts who may now be employed by the State Board of Health, or who may be hereafter appointed, to test such samples of suspected illuminating oils or fluids as may be submitted to them under the rules to be adopted by the said Board, for which service the said Board shall provide reasonable compensation at the first quarterly meeting of the State Board of Health held after the passage of this act; it shall adopt such measures as may seem necessary to facilitate the enforcement of this act, and prepare rules and regulations with regard to the proper methods of collecting and examining suspected samples of illuminating oils, and the State Board of Health shall be authorized to expend, in addition to all sums already appropriated for said Board, an amount not exceeding five thousand dollars, for the purpose of carrying out the provisions of this act. And the sum of five thousand dollars is hereby appropriated, out of any moneys in the treasury not otherwise appropriated, for the purposes of this section provided.

§ 4. Naphtha and other light products of petroleum which will not stand the flash tests required by this act may be used for illuminating or heating purposes only:—

In street lamps and open air receptacles apart from any building, factory or inhabited house in which the vapor is burned.

In dwellings, factories or other places of business when vaporized in secure tanks or metallic generators made for that purpose in which the vapor so generated is used for lighting or heating.

For use in the manufacture of illuminating gas in gas manufactories, situated apart from dwellings and other buildings.

§ 5. It shall be the duty of all district attorneys of the counties in this State to represent and prosecute in behalf of the people, within their respective counties, all cases of offenses arising under the provisions of this act.

§ 6. Nothing in this act shall be so construed as to interfere with the provisions of chapter seven hundred and forty-two of the laws of eighteen hundred and seventy-one, as regards the duties of the bureau of combustibles of the city of New York, or any other statutes not conflicting with this act, provided that nothing in this act shall be deemed to interfere with or supersede any regulation for the inspection and control of combustible materials in any city of this State made and established in pursuance of special or local laws or the charter of said city.

§ 7. All acts or parts of acts inconsistent with this act are hereby repealed.

§ 8. This act shall take effect sixty days after its passage.

This subject having been under discussion ever since the Board was organized, and a careful investigation having been made under the supervision of this committee of all the most important oil testers used in this country and in Europe, by Arthur H. Elliott, Ph. B., the results of which were published in the annual report for 1881, the Board was able, soon after the passage of the act, to adopt, in accordance with section three thereof, the instrument and methods to be employed in this State for testing oils.

At the quarterly meeting of the Board, held August 9, it was

Resolved, That for the purpose of carrying out the provisions of chapter 292 of the Laws of 1882, the following rules be and hereby are adopted.

Instruments and Tests.

(1.) The instruments to be used in testing oils which come under the provisions of section 1 of the law shall be constructed as shown in the following diagram and description:*

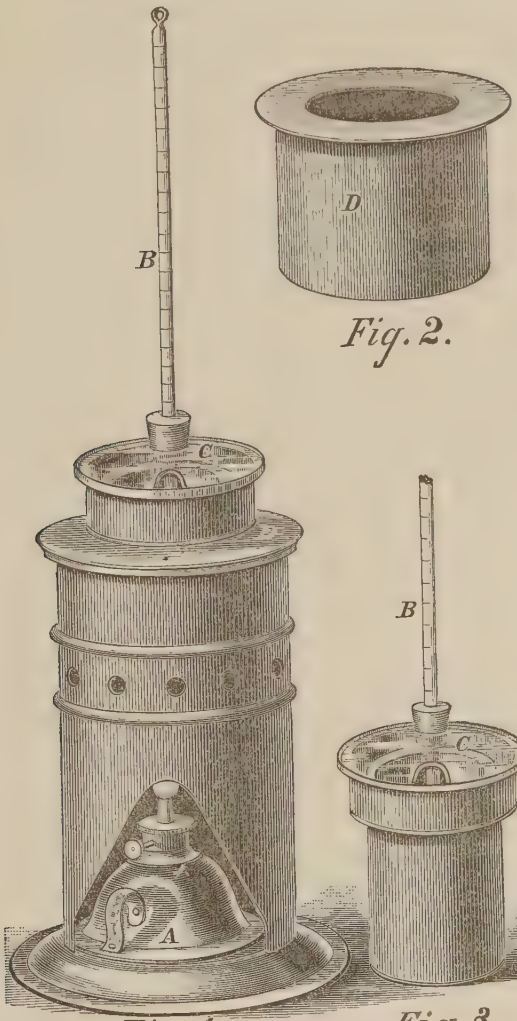

Fig. 2.

Fig. 1. Fig. 3.

*This instrument, in its original form, was devised and first employed by the Michigan State Board of Health; and a description of it will be found in its first annual report, 1873. The Wisconsin Board of Health afterward adopted the same instrument, and it is sometimes mentioned as the "Wisconsin tester." The analysts of this State, acting upon the suggestions of Mr. A. H. Elliott, have made some changes which, in their opinion, will render the testing easier and more certain.

Fig. **1** represents the instrument entire. It consists of a sheet-copper stand $8\frac{1}{2}$ inches high, exclusive of the base, and $4\frac{1}{2}$ inches in diameter. On one side is an aperture $3\frac{1}{2}$ inches high, for introducing a small spirit-lamp, *A*, about 3 inches in height, or better, a small gas-burner in place of the lamp when a supply of gas is at hand. The water-bath, Fig. **2**, is also of copper, and is $4\frac{1}{8}$ inches in height and 4 inches inside diameter. The opening in the top is $2\frac{7}{8}$ inches in diameter. It is also provided with a $\frac{1}{4}$-inch flange, which supports the bath in the cylindrical stand. The capacity of the bath is about 20 fluid ounces, this quantity being indicated by a mark on the inside. Fig. **3** represents the copper oil-holder. The lower section is $3\frac{3}{8}$ inches high, and $2\frac{3}{4}$ inches inside diameter. The upper part is 1 inch high and $3\frac{3}{8}$ inches diameter, and serves as a vapor-chamber. The upper rim is provided with a small flange, which serves to hold the glass cover in place. The oil-holder contains about 10 fluid ounces, when filled to within $\frac{1}{8}$ of an inch of the flange which joins the oil-cup and the vapor-chamber. In order to prevent reflection from the otherwise bright surface of the metal, the oil-cup is blackened on the inside by forming a sulphide of copper, by means of sulphide of ammonium.

The cover, *C*, is of glass, and is $3\frac{5}{8}$ inches in diameter; on one side is a circular opening, closed by a cork through which the thermometer, *B*, passes. In front of this is a second opening, $\frac{3}{4}$ of an inch deep and the same in width on the rim, through which the flashing jet is passed in testing. The substitution of a glass for a metal cover more readily enables the operator to note the exact point at which the flash occurs. A small gas jet, $\frac{1}{4}$ inch in length, furnishes the best means for igniting the vapor. Where gas cannot be had the flame from a small waxed twine answers very well.

(2.) The test shall be applied according to the following directions:

Remove the oil-cup and fill the water-bath with cold water up to the mark on the inside. Replace the oil-cup and pour in enough oil to fill it to within one-eighth of an inch of the flange joining the cup and the vapor-chamber above. Care must be taken that the oil does not flow over the flange. Remove all air bubbles with a piece of dry paper. Place the glass cover on the oil-cup, and so adjust the thermometer that its bulb shall be just covered by the oil.

If an alcohol lamp is employed for heating the water-bath, the wick should be carefully trimmed and adjusted to a small frame. A small Bunsen burner may be used in place of the lamp. The rate of heating should be about two degrees per minute, and in no case exceed three degrees.

As a flash torch, a small gas jet, $\frac{1}{4}$ inch in length, should be employed. When gas is not at hand employ a piece of waxed linen twine. The flame in this case, however, should be small.

When the temperature of the oil has reached 85° F., the testings should commence. To this end insert the torch into the opening in the cover, passing it at such an angle as to well clear the cover, and to a distance about half way between the oil and the cover. The motion should be steady and uniform, rapid and without any pause. This should be repeated at every two degrees rise of the thermometer until the temperature has reached 95°, when the lamp should be removed

and the testings should be made for each degree of temperature until 100° is reached. After this the lamp may be replaced if necessary and the testings continued for each two degrees.

The appearance of a slight bluish flame shows that the flashing point has been reached.

In every case note the temperature of the oil before introducing the torch. The flame of the torch must not come in contact with the oil.

The water-bath should be filled with cold water for each separate test, and the oil from a previous test carefully wiped from the oil-cup.

(3.) The instrument to be used in testing oils which come under the provisions of section 2 of the law shall consist of the cylinder shown in Fig. **1** and the copper oil-cup shown in Fig. **3**, together with a copper collar for suspending the cup in the cylinder, and an adjustable support for holding the thermometer.

(4.) The test for ascertaining the igniting point shall be conducted as follows: Fill the cup with the oil to be tested to within three-eighths of an inch to the flange joining the cup and the vapor-chamber above. Care must be taken that the oil does not flow over the flange. Place the cup in the cylinder and adjust the thermometer so that its bulb shall be just covered by the oil. Place the lamp or gas-burner under the oil-cup. The rate of heating should not exceed 10° a minute below 250° F., nor exceed 5° a minute above this point. The testing flame described in the directions for ascertaining the flashing point should be used. It should be applied to the surface of the oil at every 5° rise in the thermometer, till the oil ignites.

(5.) The thermometers used for these tests should be compared, from time to time, with a standard thermometer, with a special reference to the accuracy of the 100° and 300° marks.

Collecting and Examining Samples.

(6.) The collection of samples shall be made under the direction of the sanitary committee, by the inspector or the public analysts. The samples, properly marked, shall be placed in the hands of the public analysts for examination, and the results reported to the sanitary committee.

(7.) Whenever an accident shall occur from the explosion or ignition of any oil on the premises of a consumer, it shall be the duty of the inspector to at once secure, if possible, a sample of the oil, and submit the same to one of the public analysts for examination, and to procure such evidence as to the source of the oil and the nature of the accident as may be necessary for legal proceedings.

Prosecutions.

(8.) It shall be the duty of the inspector, with the advice of the sanitary committee, to bring to the attention of the district attorneys all violations of the law which may be discovered, and to furnish the evidence necessary to the prosecution. It shall also be the duty of the public analysts to serve as witnesses when required to do so.

Supervision.

The supervision of this work has been intrusted to the sanitary committee of this Board.

Samples of oil, and inquiries relating to the subject of rules and testing, should be addressed to the chairman of this committee, Prof. C. F. Chandler, Columbia College, Forty-ninth street and Madison avenue, New York.

The foregoing regulations and service having been ordered by this Board, the law is to be faithfully respected and enforced.

These resolutions, together with the law, were printed and freely distributed throughout the State. The public analysts were supplied with the new tester and carefully verified thermometers, and the manufacturers and dealers were instructed in regard to the test.

Nine kerosene accidents have been investigated by Mr. Albert L.Colby, inspector, four resulting in loss of life, and several others in great suffering to the victims, and in considerable loss of property. Four occurred in New York city, two in Brooklyn, one in West New Brighton on Staten Island, one at Batavia, and one in Herkimer. Besides these cases, three others of alleged accident were investigated, which proved to have been due to other causes.

The details of these investigations are presented as an appendix to this report.

Nine other accidents came to the knowledge of the sanitary committee, which it was not possible to investigate, for various reasons.

The flashing point of the oils which gave rise to these accidents varied from 80° to 97° Fahr., a very significant fact, which proves conclusively that the standard 100° Fahr. adopted by this Board is not too high, as some have suggested.

As throwing additional light on the proper standard of temperature to be fixed in determining the safety of these inflammable oils, I take the liberty of presenting the results of investigations made some time since to ascertain the temperature actually reached by oil in lamps under different conditions. Twenty-five lamps of different patterns were selected. They were all filled with the same oil, and were allowed to burn for several hours ; from time to time the temperature of the oil in the lamps was carefully determined. These experiments were repeated on different days, to ascertain the effect of the atmospheric temperature. The results are given in the following tables:

The Temperature of Oil in Burning Lamps.

First Series.—*Temperature of the Room 73° F. to 74° F.*

No.	Kind of Lamp.	Capacity of Lamp.	Temperature of the Oil.				
			After one hour.	After two hours.	After four hours.	After seven hours.	Average for the seven hours.
		oz.	deg. F.	deg. F.	deg. F.	deg. F.	deg. F.
1	Brass hand-lamp.....	8	85	82	85	86	84.5
2	Brass hand-lamp.....	24	79	83	84	82	82
3	Glass stand-lamp.....	8	77	78	79	80	78.5
4	Glass stand-lamp.....	11	77	81	84	82	81
5	Glass stand-lamp.....	20	78	79	79	80	79
6	Glass stand-lamp.....	7	82	80	85	84	82.75
7	Glass stand-lamp.....	10	84	36	84	82	84
8	Glass hand-lamp.....	9	79	78	85	85	81.75
9	Glass hand-lamp.....	6	81	82	86	86	83.75
10	Glass hand-lamp.....	7	80	78	...	...	79
11	Brass student-lamp.....	13	82	80	83	84	82.25
12	Glass stand-lamp.....	10	81	81	79	78	79.75
13	Brass stand-lamp.....	11	92	89	88	86	88.75
14	Tin lantern.....	7	89	86	88	87	87.5
15	Glass bracket-lamp	19	82	82	84	83	82.75
16	Glass stand-lamp.....	29	82	80	80	84	81.5
17	Brass student-lamp.....	7	80	...	88	...	84
18	Brass stand-lamp.....	14	84	85	87	87	85.75
19	Brass stand-lamp.....	12	100	100	92	91	95.75
20	Metal stand-lamp.....	9	82	82	88	87	84.75
21	Brass stand-lamp.....	12	91	92	88	85	89
22	Bronze stand-lamp..	16	83	76	79	85	80.75
23	Glass hand-lamp...	.....	79	80	82	82	80.75

With the air of the room at from 73° to 74° F., the temperature of the oil in the burning lamp ranged from 76° to 100° F., the highest temperature of 100° having been reached in a metal lamp at the end of one hour. That this was an exceptionally high temperature is shown by the fact that the highest temperature reached in any other lamp was 92° F. The following is a synopsis of the observations:

	23 Lamps.	11 Metal Lamps.	12 Glass Lamps.
Highest temperature reached...	100°	100°	86°
Lowest temperature reached....	76°	76°	76°
Average temperature.....	83° F.	86°	81°

SECOND SERIES.— *Temperature of the Room 82° F. to 84° F.*

No.	Kind of Lamp.	Capacity of Lamp.	TEMPERATURE OF THE OIL. After one hour.	After two hours.	After three hours.	After four hours	Average for four hours.
	Air of room.....	oz.	deg. F. 82	deg F 83	deg. F. 84	deg.F. 83	deg. F. 83
1	Brass hand-lamp.....	8	92	95	96	95	94.5
2	Brass hand-lamp.....	24	88	94	94	93	92.25
3	Glass stand-lamp.....	8	84	88	86	84	85.5
4	Glass stand-lamp.....	11	84	86	86	84	85
5	Glass stand-lamp.....	20	85	86	87	86	86
6	Glass stand-lamp.....	7	86	87	88	88	87.25
7	Glass stand-lamp.....	10	88	87	89	88	88
8	Glass hand-lamp.....	9	87	90	90	90	89.25
9	Glass hand-lamp.....	6	87	91	89	87	88.5
10	Glass hand-lamp.....	7	84	86	86	84	85
11	Brass student-lamp.....	13	86	88	88	88	87.5
12	Glass stand-lamp.....	10	85	86	86	85	85.5
13	Brass stand-lamp.....	11	104	103	101	101	102.25
14	Tin lantern.....	7	95	96	94	96	95.25
15	Glass bracket-lamp.....	19	84	85	84	84	84.25
16	Brass stand-lamp.....	29	84	85	84	84	84.25
17	Glass student-lamp.....	7	87	88	86	84	86.25
18	Brass student-lamp	14	91	93	92	91	91.75
19	Brass stand-lamp.....	12	101	100	98	96	98.75
20	Metal stand-lamp.....	9	89	92	94	93	92
21	Brass stand-lamp.....	12	88	98	94	96	94
22	Bronze stand-lamp	16	82	88	88	89	86.75
23	Glass hand-lamp.....	6	84	86	85	84	84.75
24	Brass student-lamp.....	10	120	120	120	118	119.5
25	Brass student-lamp.....	12½	112	115	115	116	115

With the air of the room at from 82° to 84° F., the temperature of the oil in the burning lamps ranged from 82° to 120° F. The temperature 120° was exceptional, being confined to one lamp.

Synopsis of Observations.

	In 13 Metal Lamps.	In 13 Glass Lamps.	In 25 Lamps.
Highest temperature reached..	120° F.	91°	120°
Lowest temperature reached..	82°	84°	82°
Average temperature reached..	96½°	86°	91½°

THIRD SERIES.—*Temperature of Room 90 deg. F. to 92 deg. F.*

No.	Kind of Lamp.	Capacity of Lamp.	TEMPERATURE OF THE OIL. After one hour.	After two hours.	After three hours.	After four hours.	Average for four hours.
	Air of the room.....	oz.	deg. 92	deg. 90	deg. 92	deg. 90	deg. 91
1	Brass hand-lamp.....	8	90	98	100	98	96.5
2	Brass hand-lamp.....	24	89	98	102	100	97.25
3	Glass stand-lamp.....	8	88	90	93	94	91.25
4	Glass stand-lamp.....	11	88	92	94	94	92
5	Glass stand-lamp.....	20	85	92	94	94	91.25
6	Glass stand-lamp.....	7	90	94	96	93	93.25
7	Glass stand-lamp.....	10	90	96	96	96	94.5
8	Glass hand-lamp.....	9	88	95	98	98	94.75
9	Glass hand-lamp.....	6	89	95	96	97	94.25
10	Glass hand-lamp.....	7	88	92	93	94	91.75
11	Brass student-lamp.....	13	89	100	102	102	98.25
12	Glass stand-lamp.....	10	88	92	93	93	91.5
13	Brass stand-lamp.....	11	106	114	116	110	111.5
14	Tin lantern.....	7	99	106	107	105	104.25
15	Glass bracket-lamp.....	19	85	92	91	91	89.75
16	Glass stand-lamp.....	29	86	91	92	92	90.25
17	Brass student-lamp.....	7	92	99	100	100	97.75
18	Brass student-lamp.....	14	94	100	100	100	98.5
19	Brass stand-lamp.....	12	108	112	112	107	109.75
20	Metal stand-lamp.....	9	91	96	100	99	96.5
21	Brass stand-lamp.....	12	104	110	108	106	107
22	Bronze stand-lamp.....	16	84	90	95	98	91.75
23	Glass hand-lamp.....	6	90	92	94	94	92.5
24	Brass student-lamp.....	10	124	129	129	128	127.5
25	Brass student-lamp.....	12½	120	126	127	127	125

With the air of the room at from 90 to 92 degs. F., the temperature of the oil in the burning lamps ranged from 84 to 129 degs. F. The highest temperature being exceptional.

Synopsis of the Observations.

	In 25 Lamps.	In 13 Metal Lamps.	In 12 Glass Lamps.
Highest temperature observed..	129 degs.	129 degs.	98 degs.
Lowest temperature observed..	84 "	84 "	85 "
Average temperature observed..	98¾ "	104½ "	92⅓ "

By these results it appears that the temperature of the oil in lamps often rises much above 100 degrees F., thus reaching a temperature at which oil, *which does not emit a combustible vapor below* 100 *degrees F.*, would be dangerous. It is apparent that 100 degrees F. is too low a standard for safety ; 120 degrees F. would not be too high a standard, and its adoption would not add three cents per gallon to the cost of the oil.

Since September 1, when the work was organized, two hundred and thirty-six samples of oil have been procured in different parts of the State, and subjected to examination by the public analysts. Of these, twenty-two samples flashed, or emitted combustible vapor, at the ordinary temperature of the laboratory before heat was applied, that is, between 73° and 75° Fahr. Thirty-three samples only stood the test provided by law. Of these thirty-three, six flashed at scarcely 100°, two at 101°, twelve at 102°, one at 103°, five at 104°, three at 106°, one at 107°, one at 108°, one at 109°, and one at 110°. Two hundred and two samples out of the two hundred and thirty-six purchased failed to stand the State test; one sample was too small in quantity to be tested. The accompanying table exhibits in detail the results of the tests :

FLASHING POINT OF TWO HUNDRED AND THIRTY-SIX SAMPLES OF KEROSENE OIL — TESTED IN 1882.

Oils flashing at temperature of Laboratory (73°–75°F), no heat applied	....	22	Oils flashing at	89°	....	16
Oils flashing at	70° F.	....	1	"	"	90	....	5
"	"	71	....	4	"	"	91	....	11
"	"	72	....	1	"	"	92	....	10
"	"	73	....	1	"	"	93	....	6
"	"	74	....	none	"	"	94	....	5
"	"	75	....	7	"	"	95	....	7
"	"	76	....	2	"	"	96	....	3
"	"	77	....	3	"	"	97	....	5
"	"	78	....	1	"	"	98	....	2
"	"	79	....	16	"	"	99	....	4
"	"	80	....	10	"	"	100	....	6
"	"	81	....	12	"	"	101	....	2
"	"	82	....	4	"	"	102	....	12
"	"	83	....	8	"	"	103	....	1
"	"	84	....	7	"	"	104	....	5
"	"	85	....	13	"	"	105	....	none
"	"	86	....	3	"	"	106	....	3
"	"	87	....	8	"	"	107	....	1
"	"	88	....	5	"	"	108	....	1
					"	"	109	....	1
					"	"	110	....	1
Total tested									235
Number of oils which stood the test									33
" " below the test									202
Not tested, samples insufficient									1
Total									236

These samples were purchased in eleven different cities and towns in the State. The accompanying table exhibits the character of the samples purchased in each town :

SAMPLES OF KEROSENE OIL—TESTED, 1882.

CITY.	Samples collect'd.	Shops from which the oil was collected.	No. which stood the test	No. below standard.
Brooklyn	147	115	5	142
New York	10	9	1	8*
West Brighton, S. I.	2	2	1	1
Albany	26	26	18	8
Herkimer	3	2	0	3
Syracuse	6	6	1	5
Rome	10	10	0	10
Potsdam	8	1	3	5
Rochester	1	1	0	1
Batavia	17	11	0	17
Buffalo	6	6	4	2
Totals	236	189	33	202

The following table shows how the samples were distributed among the analysts:

NUMBER OF OILS TESTED BY EACH ANALYST FROM AUGUST 17 TO DECEMBER 31, 1882.

Analyst.

Dr. E. G. Love, Southern District	93
Dr. F. Hoffmann, Southern District	78
Dr. W. G. Tucker, North Eastern or Central District	52
Dr. S. A. Lattimore, Western District	26
	249
Deduct for repetition on same sample	13
Total number of samples tested	236

The committee further report that Mr. J. N. Partridge, fire commissioner of Brooklyn, has adopted the instrument of the State Board, and will prosecute offenders in future. The law is now uniform for all parts of the State, excepting New York city, where the charter of the city directs the fire commissioners to fix the instruments which shall be used in testing oils. At the meeting of this Board held in November, when this matter was under discussion, the following resolution was adopted, and subsequently sent by the Secretary to the fire commissioners of New York:

*One not tested; sample insufficient.

WHEREAS, According to the provisions of chapter 292 of the Laws of 1882, the standard safe test for kerosene oil throughout the State of New York, with the exception of New York city, has been fixed by the adoption of an instrument by the State Board of Health, which establishes a standard of quality for oil which may be legally sold, similar to that which exists in Ohio, Indiana, Illinois, Michigan, Iowa, Missouri and Tennessee; and

WHEREAS, According to law, it is in the power of the fire commissioners of the city of New York to adopt the instrument approved by the State Board of Health, as has been already done by the fire commissioner of Brooklyn, and thus secure complete uniformity throughout the entire State in the legal standard of kerosene oil; therefore,

Resolved, That the fire commissioners of New York city be respectfully requested to take this matter into consideration with a view to the adoption of the State Board's approved tester.

Up to the present time no response has been received from the fire commissioners of New York. The fire department of Albany has offered to coöperate with the officers of the Board in this matter, and will in future secure samples of oil for examination by the public analysts, whenever accidents occur.

Proper attention has been paid to the accuracy of the results obtained with the tester adopted by this Board, and it has been found that when the instrument is used by persons who are experienced in its use, and with a strict adherence to the directions which were adopted by the Board, and printed in its circular, the tests rarely differ more than 1° Fahr., provided the thermometers used are accurate.

An effort was made to bring to trial the seller of the oil which caused the fatal accident at Batavia; but on bringing the matter before the justice of the peace, and presenting the facts of the case, he decided not to hold the defendant. It is now proposed to take the matter before the grand jury, and endeavor to secure indictment from that body.

II. FOOD AND DRUGS.

The following work has been accomplished under chapter 407 of 1881: One hundred and ninety-four samples of food have been purchased. Of these, one hundred and nineteen have been examined by the public analysts, fifty of which were found to be adulterated, while sixty-nine were pure.

Ninety-two samples of drugs have been purchased, of which seventy-five were analyzed. Thirty-two were found to be adulterated and forty-three pure. The two following tables exhibit the details with regard to these samples:

Samples of Food Purchased in 1882.

ARTICLE.	Pure.	Adulterated.	Total analyzed.	Not reported.	Total purchased.
Allspice	2	3	5	15	20
Arrow root	1	....	1	....	1
Baking powder	1	....	1	5	6
Baking soda	20	1	21	1	22
Butter	1	....	1	4	5
Catsup	1	....	1	....	1
Candy	1	....	1	....	1
Chicory Extract	....	....	....	1	1
Coffee Extract	....	2	2	3	5
Coffee	14	4	18	....	18
Cinnamon	3	4	7	8	15
Cream of tartar	6	22	28	5	33
Cloves	2	4	6	10	16
Flour	3	....	3	....	3
Ginger	2	....	2	3	5
Isinglass	1	....	1	....	1
Kaoka	....	....	....	1	1
Mustard	....	6	6	1	7
Mace	....	....	....	1	1
Pepper	4	4	8	15	23
Saleratus	2	....	2	....	2
Sugar	1	....	1	....	1
Tea	....	....	....	2	2
Vinegar pickles	4	....	4	....	4
Total	69	50	119	75	194

Samples of Drugs Purchased in 1882.

ARTICLE.	Pure.	Adulterated.	Total analyzed.	Not reported.	Total purchased.
Arrow root	2	2	4	....	4
Bismuth sub nitrate	1	....	1	....	1
Cocoa butter	2	2	4	....	4
Cream of tartar	7	....	7	....	7
Ipecac root,	3	4	7	....	7
Jalap	3	1	4	2	6
Magnesia, citrate of	..	1	1	....	1
Mustard	2	4	6	....	6
Orris root	3	2	5	....	5
Opium	1	....	1	....	1
Quinine sulphate	3	1	4	....	4
Rhubarb	5	4	9	2	11
Sarsaparilla root	1	....	1	1	2
Saffron, Spanish	4	3	7	3	10
Sulphur, Precip	6	7	13	....	13
Tartaric acid	....	....	....	9	9
Wax, white	....	1	1	....	1
Total	43	32	75	17	92

Samples of food and drugs have been purchased in nine different towns and cities of the State, as shown by the following table:

FOOD AND DRUGS PURCHASED IN 1882.

Name of City or Town.	Samples Food.	Samples Drugs.	Total Purchased.
New York	87	50	137
Brooklyn	.....	23	23
Albany	9	.....	9
Utica	16	6	22
Syracuse	28	5	33
Geddes	6	.....	6
Batavia	1	.....	1
Buffalo	35	5	40
Niagara Falls	12	3	15
	194	92	286

The following table exhibits the amount of work accomplished by each of the public analysts:

SAMPLES OF FOOD AND DRUGS REFERRED TO THE PUBLIC ANALYSTS IN 1882.

ANALYSTS.	Foods.		Drugs.		Totals.	
	Reported.	Not reported.	Reported.	Not reported.	Reported.	Not reported.
Dr. E. G. Love	59	28	....	9	59	37
Dr. F. Hoffmann	....	....	63	1	63	1
Dr. S. A. Lattimore	10	38	....	8	10	46
Dr. W. G. Tucker	49	10	11	....	60	10
Total	118	76	74	18	192	94
	194		92		286	

The committee further reports that twenty-four cases have been prepared for prosecution, complaints have been made and the sellers of adulterated articles have been arrested and held for trial; seventeen persons for selling adulterated cream of tartar, the percentage of adulteration varying from 37 to 95, consisting in all cases of gypsum; two cases for adulterated coffee; four cases of adulterated mustard.

The following table exhibits the details of these cases:

Prosecutions instituted in New York city in 1882 *for Violations of the Law forbidding Adulteration.*

Cream of Tartar.

NAME OF RETAIL GROCER.	Address.	Date of purchase.	Samples purchased by.	Defendant brought before Police Court.	Analysts' Report.
Peter H. Peterson	765 Second avenue	July 18	E. G. Love.	December 8	37 per cent gypsum.
Henry Fulle*	823 " "	July 18	"	December 8	92 " " " remainder tartaric acid.*
Simon Steiermann	926 " "	July 18	"	December 11	92 " " " " " "
Martin Lahm	922 " "	July 18	"	December 11	70 " " " also tartaric acid and starch.
Henry Schlichting	141 Mott street	July 18	"	December 30	95 " " " remainder tartaric acid.
John Bade	124 Canal street	August 3	F. Kolbeck.	December 12	90 " " " with tartaric acid and starch.
Ernest Spanhoff	19 Bayard street	August 3	"	December 12	65 " " " " " " " "
John H. W. Doscher	324 Broome street	August 3	"	December 14	85 " " " also tartaric acid.
Adolph Mani	21 Mott street	August 3	"	December 30	90 " " " " " " and a little starch.
Henry See Kamp	982 Second avenue	September 28	A. L. Colby.	December 8	85 " " " also corn starch and tartaric acid.
Simon Steiermann	926 " "	September 28	"	December 11	92 " " " also tartaric acid.
Henry Goldberger	983 " "	September 28	"	December 11	85 " " " also corn starch and tartaric acid.
Martin Lahm	922 " "	September 28	"	December 11	70 " " " " " " " " "
Charles Sinnigen	1002 " "	September 28	"	December 11	40 " " "
Matthew Kelly	851 Tenth avenue	October 5	"	December 8	58 " " " also flour and tartaric acid.
Frederick Diedrich	499 West 57th street	October 5	"	December 8	91 " " " also tartaric acid.
Diedrich F. Deike	881 Tenth avenue	October 5	"	Sick.	92 " " " " " "

Coffee.

John O'Conner	838 Tenth avenue	October 5	A. L. Colby.	December 18	About 15 per cent of chiccory.
George Bain	981 Second avenue	September 28	"	December 29	Burnt pease and about 10 per cent of chiccory.

Mustard.

Simon Steiermann	926 Second avenue	September 28	A. L. Colby.	December 18	40 per cent wheat flour.
Anna Wedekind	1014 " "	September 28	"	December 29	40 " " " "
Charles Sinnigen	1002 " "	September 28	"	December 18	53 " " " "
Philip Greifenstein	833 Tenth avenue	October 5	"	December 18	71 " " " "

Precipitated Sulphur.

George Cutts	508 Third avenue	December 16	A. L. Colby.	December 30	30 per cent sulphate of lime.

*Tried and convicted, Court of Special Sessions, January 8th and 9th, 1883.

One of the defendants, Henry Fulle, was brought to trial before the Court of Special Sessions, on January 8th and 9th. The case was vigorously defended, it is understood, at the expense of the wholesale dealers. The retail dealers have generally stated to the representatives of the Board that it is not their intention to contest the law, that they regard it as for their benefit. The opposition appears to come entirely from the manufacturers and wholesale dealers in adulterated articles. The court convicted the defendant and imposed a nominal fine of ten dollars, this being the first offense. The case is to be appealed at once.

III. MILK.

The perishable character of milk makes it necessary that the enforcement of the law against its adulteration should be undertaken by the local boards of health. With a view to calling attention to the importance of this subject the following resolutions were adopted at the November meeting of the Board:

WHEREAS, The adulteration of milk is extensively practiced in every part of this State; and

WHEREAS, There is no article of food, the adulteration of which is so liable to produce such serious consequences; and

WHEREAS, The perishable nature of milk makes it impossible for the State Board, through its inspector and public analysts, to take charge of this subject, therefore

Resolved, That the attention of the local boards of health be called to this matter in the hope that some system of inspection may be adopted by them to remedy the existing evil.

IV. WATER.

The sanitary committee also reported that during the past year ten samples of drinking water have been examined by the public analysts at the request of local authorities, most of which have been found to be unwholesome.

The following table exhibits this work:

Description of Samples.

No.	Source.	Town or City.	County.	From whom received.	Analyst.
1	Hydrant.	Owego.	Tioga.	Dr. W. L. Ayer.	Dr. Tucker.
2	Reservoir.	Owego.	Tioga.	Dr. W. L. Ayer.	Dr. Tucker.
3	Well.	Knowlesville.	Orleans.	Dr. H. C. Tompkins.	Dr. Lattimore.
4	Well.	Knowlesville.	Orleans.	Dr. H. C. Tompkins.	Dr. Lattimore.
5	Well.	Knowlesville.	Orleans.	Dr. H. C. Tompkins.	Dr. Lattimore.
139	Well.	Geneva.	Ontario.	Dr. M. H. Picot.	Dr. Lattimore.
140	Spring.	Geneva.	Ontario.	Dr. M. H. Picot.	Dr. Lattimore.
	Pump.	Brooklyn.	Kings.	Dr. J. H. Raymond.	Dr. Love.
8001	Well.	Amsterdam.	Montgomery.	Dr. Stover.	Dr. Tucker.
8002	Spring.	Amsterdam.	Montgomery.	Dr. Stover.	Dr. Tucker.

ANALYSIS OF POTABLE WATERS.

Parts in one hundred thousand.

Number.	Appearance in two foot tube. Color.	Odor when heated to 100 deg. F.	Chlorine in chlorides.	Phosphoric acid in phosphates.	Nitrogen in nitrates & nitrites.	Free ammonia.	Albuminoid ammonia.	Oxygen absorbed at 80 deg. F.		Hardness equivalent to carbonate of lime.		Total solids dried at 220 deg. Fahr.	Microscopical examination of deposit.	Conclusion.
								In fifteen minutes.	In four hours.	Before boiling.	After boiling.			
										Deg.	Deg.			
1	Light greenish yellow	Very slight	0.20	Bare trace	0.23	0.0021	0.0210	0.128	0.2450	2.8	2.8	5.71	Vegetable debris and spores infusoria and diatomacea	Condemned.
2	Light brownish tint. Slightly turbid	Slight	0.16	Trace	0.25	0.0032	0.0218	0.139	0.254	2.8	2.8	6.41	Vegetable debris and spores diatomacea and some infusoria	Condemned.
3	Fainty yellow	None	6.55	None	0.1250*	0.0050	0.0060	0.0645	0.0842	39.20	19.14	61.80	Vegetable debris and fibres of wood	
4	Colorless	None	8.40	None	0.2500*	0.0190	0.0620	0.0561	0.0880	40.80	25.42	120.80	Vegetable debris and fragments of insects	
5	Colorless	None	6.20	None	0.0625*	Trace	0.0120	0.0579	0.0870	46.00	23.60	98.36	Vegetable fibres	
139	Colorless	None	0.25	None	0.0125*	0.0020	0.0030	0.0315	0.0575	34.12	15.62	37.80	Vegetable fibres and a few infusoria	Good.
140	Colorless	None	0.375	None	0.0125*	0.0060	0.0090	0.0168	0.0575	27.52	13.76	40.80	Infusoria cyclops, Diatoms, Vorticellæ, etc.	Good.
	Yellowish. Slightly turbid	Very slight	5.857	Heavy traces	0.3623	0 0060	0.0080	0.0908	0.1589	10.3	7.5	55.64	Mineral matter: vegetable debris	
8001	Light greenish yellow. Clear.	None	8.600	Trace	0.17	0.0018	0.0294	0.0890	0.1750	20.0	15.5	88.0	Vegetable debris, no moving organisms.	Condemned.
8002	Light bluish tinge. Clear	None	2.30	Trace	0.12	0.0016	0.0036	0.022	0.0410	21.5	11.5	46.0	Vegetable debris infusoria	Better than No. 8001

*Crum's process.

V. DISTRICTING THE STATE.

For the convenience of the public analysts the State has been divided into three districts as follows:*

I. Southern District, embracing Sullivan, Ulster and Dutchess counties, and all of the State south of them. The public analysts for this, the most populous district, are E. G. Love, Ph. D., and F. Hoffmann, Ph. D., both of New York city.

II. North-eastern District, embracing Columbia, Greene, Delaware, Broome, Cortland, Madison, Oneida, Lewis and Jefferson counties, and all that portion of the State north and east of them. The public analyst for this district is Willis G. Tucker, Ph. D., of Albany.

III. Western District, embracing Tioga, Tompkins, Cayuga, Onondaga and Oswego counties, and all that portion of the State west of them. The public analyst for this district is S. A. Lattimore, Ph. D., of Rochester.

VI. CONCLUSION.

In carrying out the provisions of chapter 407 of 1881, and chapter 292 of 1882, the committee finds itself very much embarrassed from want of inspectors. There is only one inspector, Albert L. Colby, Ph. B., of New York, for the entire State. His duty involves the purchase of samples of food and drugs and oil, investigating kerosene accidents, making inspections of oil refineries and other manufacturing establishments at Hunter's Point, and responding to general calls made upon him by the sanitary committee, or by the Secretary of the Board. In addition to this, a considerable amount of time is involved in preparing cases for trial, and in attending court. With the present litigations in progress in New York city, it seems important that at least an additional inspector be appointed for the other portions of the State. It is desirable that the person purchasing the samples be competent to test them, in order that in making complaint he can testify, not only to the fact of the purchase, but also to the fact of the adulteration, and thus avoid the necessity of calling public analysts from a distance to attend a preliminary hearing.

All of which is respectfully submitted.

C. F. CHANDLER,
Chairman Sanitary Committee.

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* A fourth, to be known as the Southern Tier District, with Prof. G. C. Caldwell, Analyst, of Cornell University, has been provided by the Board.

KEROSENE ACCIDENTS.

RESULTS OF INVESTIGATIONS MADE BY ALBERT L. COLBY, PH. B., INSPECTOR.

Appendix to the Report of the Sanitary Committee.

Case 1.

Date of accident.— Thursday, August 31, 1882, 1:30 A. M.

Date of inspection.— September 2, 1882.

Place of occurrence.— New York city, No. 51 Hester street; first floor front. Premises occupied by A. Kaliska, clothing maker.

Results of accident.— Slight damage to goods.

Description of accident.— The fire was first seen by the watchman in the street. The lamp took fire without apparent cause. No one was in the room at the time. The windows and doors were all closed, hence there could have been no drafts. Two men, sleeping at the time in an adjoining room, and who had gone to bed and left the lamp burning, were first awakened by the watchman trying to break open the hall door leading into the room, when the fire occurred. They rushed in and smothered the fire with clothes. No explosion was heard by any one. The lamp was broken in pieces before any one saw it.

Character of lamp.— Hanging glass lamp, supported midway between ceiling and floor by means of iron-wire frame-work.

Samples of the kerosene collected.— No. 3001. All the oil which remained in the gallon can from which the lamp had been filled. No. 3002. Entire contents of a similar lamp said to have been filled at the same time and from the same gallon filler as the lamp which exploded. No. 3003. Sample of same priced oil as that which caused the fire, purchased where that had been procured.

Report of public analyst.— No. 3001. Too small an amount to test. No. 3002. Flashing point 97 deg. F. No. 3003. Flashing point 91.6 deg. F. 93 deg. 91 deg. 91 deg.

Dated *November* 17, 1882.

Case 2.

Date of accident.— Saturday, September 9, 1882, 8:30 P. M.

Date of inspection.— September 12, 1882.

Place of occurrence.— New York city, No. 315 East Forty-sixth street; apartment house, second story front. Rooms rented by T. J. Loomis.

Results of accident.— Miss Fannie Loomis, aged forty, was severely burned. She died of her injuries on September 11, 1882. Furniture in the apartments destroyed.

Description of accident.— The fire was first seen from the street by a police officer. On reaching the room he found Miss Loomis badly burned. The furniture of the room was also ablaze. A broken lamp lay on the floor.

Character of lamp.— Glass table lamp with metal base.

Samples of kerosene collected.— On inspection I was unable to secure

any of the oil from the filler from which the lamp had been filled, for every thing was destroyed. No. 3007. The same quality of oil as that which caused the fire, purchased at the grocery store where the other oil had been bought.

Report of public analyst.— No. 3007. Flashing point 93 deg. F.

Dated *November* 17, 1882.

Case 3.

Date of accident.— Sunday, September 17, 1882, 3 A. M.

Date of inspection.— November 24, 1882.

Place of occurrence.— Brooklyn, No. 50 Hamburg avenue. Apartment house, second story. Premises rented by Mr. Wyschut.

Results of accident.— Henry Wyschut, aged fourteen, severely burnt about the body.

Description of accident.— The lighted lamp standing on the table was upset. The table-cloth took fire and Henry Wyschut in trying to extinguish the flames was severely burnt.

Character of lamp.— A heavy glass table lamp with metal standard and marble base.

Samples of the kerosene collected.— No. 3200. Sample of same priced oil bought at the grocery where the family had always purchased oil.

Report of public analyst.— No. 3200. Flashing point, 96 deg. F.

Dated, *November* 30, 1882.

Case 4.

Date of accident.— Thursday, October 4, 1882, between 1 and 2 A. M.

Date of inspection.— October 10, 1882.

Place of occurrence.— Genesee county, Batavia, south-west corner Bank and North streets. Frame house owned and occupied by Mrs. Lucy Gay.

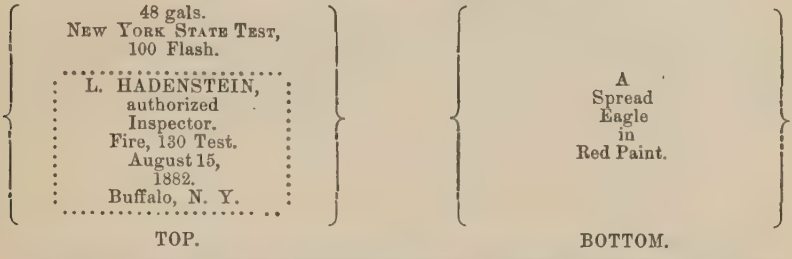
Results of accident. — Miss Ellen Gay, aged thirty-five, burned to death. Mrs. Gay's house and small barn burned to the ground; nothing saved. The adjoining frame house, owned and occupied by Mr. Charles P. Hurd and family, was also burned to the ground. Furniture mostly saved.

Description of accident.— Mrs. Lucy Gay was going down back stairs with a lighted lamp in her hand. On reaching the foot of the stairs, which came out directly into the sitting-room, she accidentally dropped the lamp. Mrs. Fanny De Voll, a lady renting the front of the house, was awake in her room at the time (a distance of thirty feet from the place of accident). She heard Mrs. Gay come down stairs and heard the lamp fall. She heard no explosion, but it "sounded like pretty heavy glass breaking into atoms," then immediately the whole room was in a blaze. The fire spread rapidly.

Character of lamp.— Ordinary sized glass table lamp with metal upright and marble base.

Samples of the kerosene collected.— Mrs. Gay purchased the oil with which the lamp was filled at the time of the accident, on September 25, 1882, from Henry B. De Lano, retail grocer, No. 47 Jackson street, Batavia, N. Y. She bought one gallon and paid ten cents for it.

Nos. 3123 and 3124 were procured by me on October 10th from Henry B. De Lano, grocer, and came from the same barrel from which Mrs. Gay's oil had been drawn. Mr. De Lano bought this barrel of kerosene oil from Newman J. Nobles, oil jobber, Batavia, who had purchased it on August 24, 1882, from the Phœnix Refining Company, Buffalo, N. Y. This barrel was marked as follows :



Note.— The portion of the above label surrounded by dotted line seemed in my opinion to have been made with a separate stencil from the other. Hence, L. Hadenstein only authorizes this to be "*Fire* 130 *Test*," which is not "*New York State Test* 100 *Flash*."— A. L. C.

Report of public analyst.— No. 3123. Flashing point, 80 deg. F. 78 deg. F. No. 3124. Flashing point, 77 deg. F.
Dated *December* 31, 1882.

Case 5.

Date of accident.— Wednesday, November 1, 1882, 8 A. M.
Date of inspection.— November 24, 1882.
Place of occurrence.— Brooklyn, No. 191 Park avenue. House occupied by Mrs. Pechin.
Results of accident.— Miss Maggie Hitchcock, aged twenty, was severely burned. She died of her injuries on November 10, 1882.
Description of accident.— Miss Hitchcock, of Glen Cove, Long Island, at the time visiting with Mrs. Pechin, while dusting the kitchen mantelpiece, noticed that a lamp filled with oil, standing there, seemed to have leaked. The lamp was cracked, and as she lifted it the bottom part stuck to the mantelpiece and the oil spilt down over her dress and on to the range. Her clothes took fire at once and she was burned so severely as to result in her death.
Character of lamp.— A flat-wicked glass bracket lamp. The bracket was provided with two little teeth and a screw for holding the lamp in place; probably the bottom rim of the glass lamp became cracked from tightening the screw.
Samples of the kerosene collected.— No. 3199. Sample of oil used in the house at date of inspection. This was purchased from the same peddler and at the same price as the oil in use at the time of accident. Cost, twenty cents per gallon.
Report of public analyst.— No. 3199. Flashing point, 96 deg. F.
Dated *December* 31, 1882.

Case 6.

Date of accident.— Wednesday, November 15, 1882, 4:50 P. M.
Date of inspection.— November 23, 1882.

Place of occurrence.— Richmond county, West Brighton, Staten Island. Signal light factory owned by W. F. Coston, Castleton avenue, near Columbia street.

Results of accident.— Mr. Coston's factory, a two-story frame building, was burned to the ground. Contents destroyed. An adjoining shed and barn owned by Morgan & Berry, carriage manufacturers, also burnt. Total loss, $3,000.

Description of accident.— One of the girls in the factory, after lighting a kerosene lamp, endeavored to replace it in the bracket against the wall above the work-table. She dropped it, however, and it fell on the table, setting fire at once to some varnished paper. The flames spread rapidly, as much combustible material was in the factory.

Character of lamp.— Glass bracket lamp.

Samples of kerosene collected.— No. 3197. Sample procured from a large can at Mr. Coston's residence, from which the oil used in the factory was drawn.

Report of public analyst.— No. 3197. Flashing point, 95 deg. F. Dated *December* 31, 1882.

Case 7.

Date of accident.—Saturday, November 18, 1882, 12:30 A. M.

Date of inspection.— November 20, 1882.

Place of occurrence.— New York city, No. 907 Broadway, Room 1 B, occupied as an office by S. H. Morris, M. D.

Results of accident.— Dr. S. H. Morris was severely burned about the head and on the arms and hands.

Description of accident. — Dr. Morris, returning to his office late, lighted a German student lamp, placed it on a wooden-bottomed chair and sat down in another chair near the fire to read. He first noticed a "hissing" sound, and turning, saw the oil in the small receiver underneath the wick (used for catching drippings), was ablaze. The blaze extended up to the wick. The burning oil had dropped down and set fire to the chair. He caught the lamp in one hand and the burning chair in the other and had gone about ten feet in the hall when an explosion occurred and he was covered with burning oil.

Character of lamp.— Nickel-plated "German student lamp."

Samples of the kerosene collected. — No. 3194. A three pint sample of oil taken from a patent gallon can labeled "Pratt's Astral Oil." The lamp had been filled from this can. The can had simply the paper label pasted on it, giving directions for using "Pratt's Astral Oil," signed Charles Pratt & Co., No. 46 Broadway, New York.

Report of public analyst.— No. 3194. Flashing point, 95 deg. F. Dated *December* 31, 1882.

Case 8.

Date of accident.— Sunday, November 19, 1882, evening.

Date of inspection.— November 20, 1882.

Place of occurrence.— New York city, No. 521 East 14th street. Rear house, room 6, second floor, occupied by Francis Hagan and family.

Results of accident.— Ann Brewer, a deaf-mute aged thirty-eight, was very severely burnt. Furniture of the room much damaged.

Description of accident. — Francis Hagan, while drunk, threw two lighted lamps at Ann Brewer. One broke near her, setting fire to her clothes. The furniture in the room was much damaged by the fire.

Character of lamp. — Glass table lamp with metal upright and marble base.

Samples of the kerosene collected. — No. 3195. Sample came from kerosene lamp which was filled at same time from same filler as that which caused the fire. No. 3196. Quart sample of kerosene bought at John H. Hake's, No. 224 Avenue A, grocer, where Francis Hagan had bought his oil. I paid three cents for it. Same price that Hagan paid.

Report of public analyst. — No. 3195. Flashing point, 89 deg. F. No. 3196. Flashing point, 90 deg. F.

Dated *December* 31, 1882.

Case 9.

Date of accident. — Monday, November 27, 1882, 9:30 P. M.

Date of inspection. — December 23, 1882.

Place of occurrence. — Herkimer county, Herkimer, No. 12 Mary street. Residence of Mr. Peter J. Casler.

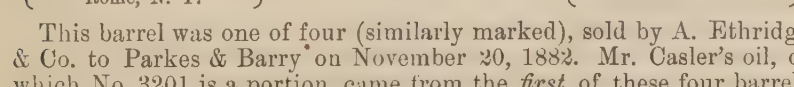
Results of accident. — Mrs. Casler was so severely burnt that she lived but a day after the accident. Mr. Casler was badly burnt on the arms and hands when attempting to put out the fire.

Description of accident. — Mrs. Casler while going down cellar carrying a lighted lamp tripped on the stairs, and when falling probably threw the lamp against the wall. It broke and the burning oil set fire to her clothing.

Character of lamp. — A small standard lamp — all glass.

Samples of the kerosene collected. — Mr. Peter J. Casler purchased two gallons of oil, a portion of which was in the lamp at time of accident, from Parkes & Barry, retail grocers, Foxe's block, Herkimer, on November 23, paying for it fourteen cents a gallon.

No. 3201. Sample from the two gallon can from which the lamp had been filled previous to accident. The sample was taken from the can on November 30th by James K. Baldwin, and saved for me till date of inspection. Nos. 3203, 3204. Samples procured by me on December 23d at Parkes & Barry's store, from a barrel marked as follows:



This barrel was one of four (similarly marked), sold by A. Ethridge & Co. to Parkes & Barry on November 20, 1882. Mr. Casler's oil, of which No. 3201 is a portion, came from the *first* of these four barrels opened at the store. Nos. 3203 and 3204 were taken by me from the last of these four barrels.

Report of public analyst. — No. 3201. Flashing point, 93 deg. F. No. 3202. Flashing point, 91 deg. F. No. 3203. Flashing point, 93 deg. F.

Dated *December* 31, 1882.

The following casualties, attributed to kerosene oil, proved on investigation to have been falsely reported.

No. 1.

Brooklyn, *October* 29, 1882.

(From the N. Y. *Tribune*, October 30, 1882.)

"*Flames due to kerosene.*— The explosion of a kerosene lamp caused a fire last evening in the grocery of Joseph Stringer, No. 470 De Kalb avenue, Brooklyn. Stringer's loss on stock and fixtures was $1,000; insured for a similar amount in the London Insurance Company. The building, belonging to the Taylor estate, was damaged to the extent of $500."

Date of inspection.— November 24, 1882.

Corrections. — John String, No. 407 De Kalb avenne.

Origin of fire. — Incendiary.

No. 2.

New York, *November* 5, 1882.

(From the N. Y. *Tribune*, November 6, 1882.)

"*Burned with kerosene oil.*— Pauline Hayes, aged twenty-one, of Sixty-fifth street and Tenth avenue, was severely burnt about the body last night while lighting a fire with kerosene, and was taken to Roosevelt Hospital."

Date of inspection.— November 6, 1882.

Origin of fire.— Her clothes were set on fire by a burning match when attempting to light the kitchen fire.

No. 3.

Brooklyn, *December* 3, 1882.

(From the N. Y. *Tribune*, December 4, 1882.)

"*Flames in a dry goods store.*— The explosion of a kerosene lamp caused a fire which did much damage in the dry goods store of Roger Hart, No. 315 Grand street, Brooklyn, early yesterday morning. By hard work the firemen confined the flames to the building in which they broke out. The loss on stock to Mr. Hart was $5,000. It was insured. The damage to the building owned by Philip Strauss, who lived on the upper floor, was estimated at $3,000. It was insured for $6,000. The loss on furniture to Mr. Strauss was $1,500. It was insured for $2,200."

Date of inspection.— December 6, 1882.

Origin of fire.— Not certainly known, supposed to have been incendiary, but at any rate kerosene was not the cause.

[C.]

REPORT OF THE STANDING COMMITTEE ON REGISTRATION AND VITAL STATISTICS.

The system adopted.— The statutes of 1847 and 1880 gave permissive authority to the county boards of supervisors to provide ways and means for obtaining and registering the records of deaths, births and marriages throughout the State. As those laws failed to develop any general desire or correct information for the organization of this branch of public duty by county authority, and as the State Board of Health had come into existence with certain defined authority to advise and direct in the preparation of methods and forms for the required records, as well as for preparing needed amendments of those pre-existing laws, the utmost aid which the county authorities could be induced to give was accepted as the basis for preparing to obtain complete local registration, or at least complete local records, from towns, villages and cities. The amendments of law to attain this object are now embodied in section 3 of the general health law, as made in chapter 351 of the Session Laws of 1882.

By the amended laws the local boards of health are required to supervise and *make complete* the registration of births, deaths and marriages within the limits of their jurisdiction, and, in a special manner, every such board is required to "have the supervision of the registration of deaths, diseases and the causes of death, and, by its appointed officers, to examine all certificates and records of death, and findings of coroners," etc., and to regulate burials, etc., etc., for the protection of the public health. Under the same statute the more perfect organization of the local boards of health was required and the State Board was authorized to order any negligent community to organize its town board of health, and to require of any and every local board of health in the State, whether of town or city, that its registry of vital statistics be complete and perfect. The means to be adopted to secure, and if need be, enforce this required completeness and perfecting, the State Board has to devise; and as the latest amendment of the law (subdivision 5 of section 3, chapter 351 of Laws of 1882) requires this Board, after due notification, etc., "to take such control and adopt such means for causing compliance with the rules and regulations of the records as will secure their completeness and proper registration," efforts are being made to secure such registration throughout the entire State. A safe limitation of the cost (*per record*) has been fixed by the amended law, and the cost, within that limit, namely, "not to exceed fifty cents for each completely verified and registered record of a birth, death or marriage," is "a charge upon the town, village or city." In this manner the ability of the local boards and registry clerks is to be tested, and, to any necessary degree, developed, by the State Board.

Gradual and painstaking as all this work must be, the local government methods have to be accepted and developed as the basis of the State sanitary system, and in that system this duty of registration of vital statistics reposes as an integral part. Had this branch of public

service been already in operation when the sanitary system was created, in 1880 and 1882, the latter might not, for the present, have been burdened with this duty, though, before many years, the registry of deaths and births must be placed within the jurisdiction of sanitary government in every State. This Board has recognized its obligation to make the Bureau of Registration and Vital Statistics a model of fitness and completeness as a helpful branch of the public health service; and in doing this it is found to be essentially necessary to enlist the active interest and participation of every community in securing full compliance with all the forms and requirements for perfect records. To accomplish this it has been necessary to expedite and perfect the organization of the local boards of health, while obtaining the best records possible under the Laws of 1880 by town and village clerks, and while the twenty-four cities pursue the methods they prefer until their registry service and their forms and books of record shall be harmonized and made uniform with the State system. At the present time about 5,000,000 out of the estimated 5,500,000 inhabitants of the State are provided with all the means and methods of the system of registration adopted by the State Board in the Bureau of Vital Statistics. Not many months will elapse before every township and city, and all villages that register separately from towns in which they are situated, will possess all the means for keeping these records as the laws require, and in forms adopted for the State system of registration.

Local publication and uses of the registered records.— In most of the cities and in the larger villages the health board or the registry clerk publishes a weekly or a monthly summary of the records as received for registration. The chief object served by these periodical summaries being that of recording a useful statement of the causes and statistics of mortality, these publications will be gradually brought into a uniform method: (1) for cities, with weekly bulletins; and (2) of villages and towns, as well as cities of the smaller class, which will prefer to make only monthly statements. The State Board has prepared the proper form and schedule for monthly statements by all registry officers, and has ordered the monthly publication of a public health statement by its Secretary. Quarterly and annual statements should be expected from every city as well as from this Board. The forms for each of these public statements or bulletins of information are now in readiness, and those for the State Board's use must wait the perfecting of registration in the cities.

The forms of records and registers.— These are at last uniform throughout the State. The local authorities have evinced a kindly appreciation of the importance of the uniformity required, and householders and nearest friends, wherever a certificate is required to be filled out for the individual records, have learned to do their part to perfect these records and prepare the same for completion and attestation by the professional attendants. Copies of the forms used for securing these records for registration are here appended (in shortened lines):

STATE OF NEW YORK. Form 3.

County of _____

No. of corresponding Entry in Register Book of Deaths to be inserted here by the Registrar. [ ]

CERTIFICATE OF DEATH.

.....City (Village), or Township.

Should be certified by the head of the family or other responsible friend.

1. Full name of deceased (If an infant not named, give parents' names.)
2. Age..years..months..days. Sex..Color and (Race, if other than the White.)..
3. Single, Married, Widowed (Cross out words not required in this line.). 4. Occupation.....
5. Birthplace (and State or Country.).....(How long in the United States, if of foreign birth.).....
6. Father's Name and Birthplace.....(State or Country.).....
7. Mother's Name and Birthplace.....(State or Country.).....
8. Place of Death (If an Institution, state its name.)....(How long resident here.)...(If dying away from home, give home residence below.)

.....

9. Date and Hour of Death :— Died on the.....day of.....
188 , at about.....M.
10. I hereby report this Death, and certify that the foregoing statements are true according to the best of my knowledge.

(Signature and residence of reporter.).....

Certified by the Physician and according to sec. 1, chap. 512, Laws of 1880.

11. I hereby certify, That I attended the deceased from...188 , to.....188 , that I last saw h.....188 , that.....died on the.....day of.....188 , about.....o'clock.....M., and that to the best of my knowledge and belief the cause of h.....death was as hereunder written:

	Duration of Disease in Years, Months, Days, or Hours.				
Chief and Determining					
Consecutive and Contributing.					

† The duration of each Disease, when given, is reckoned from its commencement until death.

Sanitary observations.....

.....

Witness my hand this.....day of.....188 .

No. of Burial Permit..... (Signature,).....M. D.

Place of Burial.....

Date of Burial..... Residence,.....

Name and Residence of Undertaker.....

☞ The Superintendent of Vital Statistics cautions all persons against accepting or using this certificate for any purpose except that of delivering it for a burial permit and registration.

STATE OF NEW YORK. Form 1.

County of..... Town of.....

Registered No.

BIRTH RETURN.

(in full when possible.)

1. Name of Child.....
2. Sex.....(Color or Race, if other than the White.).....Date of Birth.....188 .
(If city, give name, street and number; if not, give townsh'p, (village, (and county.)
3. Place of Birth.....
4. Name of Father.....(If out of wedlock and name not given, write O. W.)
5. Maiden and full name of Mother, ...
6. Birthplace (or Country) of Father.....Age....Occupation.....
7. Birthplace (or Country) of Mother.....Age.....
8. Number of this Mother's previous children. ..... How many of them now Living. .....
9. Name and address of Medical Attendant or other authorized person, in own handwriting, Attest. .....
.....
10. Date of this Return.....

Form 7.

TO THE BUREAU OF VITAL STATISTICS,

Registered Number.

STATE OF NEW YORK.

RETURN OF A MARRIAGE.

In the Town (Village) City of.....County of.....

1. Full name of GROOM, ...
2. Place of Residence, ...
3. Age next Birthday,.....years,.....
4. .....
5. Occupation, ...
6. Place of Birth, ...
7. Father's name, ...
8. Mother's Maiden name,.....
9. No. of Groom's Marriage,.....
10. Full name of BRIDE,.....
Maiden name, if a Widow,.....
11. Place of Residence, ...
12. Age next Birthday,.....years.....
13. .....
14. Place of Birth,.....
15. Father's Name, ...
16. Mother's Maiden name,.....
17. No. of Bride's Marriage,.....

N. B.— At Nos. 4 and 13: If of other than the White Race, specify it. At Nos. 9 and 17 state whether 1st, 2d, 3d, etc., marriage of each. The signatures below of Bride and Groom, should be written out in full for the "given" and family names.

Dated at.....188 .

We, the Groom and Bride named in the above Certificate, hereby certify that the information given is correct, to the best of our knowledge and belief.

.....(Groom.)
.....(Bride.)

Signed in presence of.....
and.....

CERTIFICATE OF MARRIAGE.

This return of marriage should be made to, and registered by, the authorities specified by law within three days after the marriage ceremony. ☞ This certificate is to be sent to the State Bureau of Vital Statistics, on or before the 15th of the month, after its date and local registry.

In the Town (Village) City of..... County of.....

STATE OF NEW YORK.

I hereby certify, that.....and.....were joined in marriage in our presence, in accordance with the laws of the State of New York, on this.....day of.....188 , at.....

Witnesses to the marriage, Attest:
.....
.....
Official station.....
Residence.....

This certificate is upon the reverse of the record as given on the opposite page.

The forms used for burial permits, transits, still-births, and for official transcripts from the registers, are entirely uniform throughout the State. The blanks for certified records are officially placed in every school district, and in the hands of all members and officers of boards of health. Local authorities, changeable as they are by the annual elections, find no great difficulty in their part of the registry duties, and families are not indifferent to their share in them. Only the professional attendants upon births and upon marriages demur at the burden the laws impose upon them to make and keep, and under local regulations, to send up for registration, these documents by them certified. Lawful and just as it may be for the State to demand such service from medical attendants and the clergy, it is somewhat burdensome and it falls short of securing all that is required in records and also falls short of numerical completeness. A vast number of children are born without the attendance of a physician; and as to the attestation of marriages in the State of New York, the laws provided no means for securing the registry of any except those which the registry officers may induce the clergy and magistrates to report. Failing to prescribe any duty or define any obligation of the man and woman, or of either of the families concerned with the marriage, as respects making and filing the personal records of the couple, and leaving the duty of making such records wholly to the minister or magistrate who is required to certify or attest the ceremonial, the existing laws concerning marriage registration leave open a way to inaccuracy, incompleteness and neglect of this class of records. This essential defect in the laws is heightened by the fact that no general statute has yet defined by what means or by what persons the certificates of marriage or of birth shall be filed with the registry clerk. Local regulations may be framed and enforced, and

the general rules promulgated by the State Board may give a good degree of uniformity to the returns, yet the defects in the statutes lead to a total or optional neglect by professional attendants at marriages and births to make out the required records and file their certificates. These sources of default in the public registration of marriages and births, must be overcome, and in the absence of ecclesiastical and civil surveillance that can never be exercised in free States, it will be necessary to enlist the self-interest and honor of the persons and officials concerned in records and registration of these epochs in the founding of families and their generations. This may be done, ere long, by an acceptable improvement in the laws, aided by the general dissemination of information and the formal facilities for the prompt preparation of such records in every household where the events to be recorded occur, and by the persons who are first in their responsibility and social interest, concerning them. The State Board is using all means now available to secure complete and perfect records, and will be constrained to seek some improvement in the laws.

The records of mortality are now satisfactorily provided for under the general law for the preservation of the public health (chapter 351 of 1882), especially as that statute confers full authority over all burials and requires "that there shall be no burial of any dead person until the certificate of the death and its causes, if known, shall have been made and presented, and until thereupon a permit for burial shall have been given." The formal certificates of death and the local rules and regulations concerning it are uniform in all places throughout the State, and they serve their first purpose in securing a fairly correct record upon which the burial is to be permitted and the health officer is to be informed of the circumstances and causes of mortality, while, in the second place, the public registry of these records of death perpetuate the identity and essential facts of the individual life and the causes that have terminated it. The immediate uses of these records may not only insure rights of kindred and estates and greatly facilitate the adjustment of business obligations and social duties, but they also apply to most important sanitary questions when the death-records are read, week by week, as a kind of barometry of health and disease in the localities, dwellings and classes of persons among which the deaths occur. Even the returns made by coroners are, under the present general statute, subject to the same review and judgment as other records of death; nor are these the least important records which local health officers examine for testimony concerning preventable causes of death. With rare exceptions a medical certificate of the cause of death is required in a return from a coroner.

It is made the duty of every board of health, under the amended law, to examine the returns of coroners, and to require, in connection therewith, a correct medical record of the causes of death.

Progress in local registration of vital statistics.— The State Board of Health having, in 1881, determined (and being by further amendment of law in 1882 required) to make the registration complete through the agency of local boards of health exclusively, resolved to depend no longer upon the means which county boards of supervisors had been empowered to use under the Laws of 1847 and 1880 (chapters 154 of 1847, and 512 of 1880). The work of organizing the local

boards of health effectually has been a duty necessarily preceding the collecting, registering and analysis of the records of death, birth and marriage which local registrars in towns, villages and cities are required to forward monthly to the State Bureau of Vital Statistics.

Experience had abundantly shown that in no instance would the *ex-officio* registry clerks in counties, towns, villages and cities, as designated in the laws preceding the act of 1882, make, or even be able to make, complete or satisfactorily correct registration in any one of its three branches. New York, Brooklyn, Yonkers and Rochester were the only cities in the State in which vital statistics were found recorded with even approximate completeness and care as regards death, while the registry in the other branches all alike utterly failed to attain a reasonable completeness. Therefore, the necessity for securing adequate authority and suitable methods for perfecting the registry of vital statistics in its three branches has come to be regarded as the first essential in founding the State system of registration.

Each local board of health, upon organizing, has been required promptly to undertake the duties of local registration; and as efficiency by any one of these depends upon the information imparted, and such other aids toward compliance as were possible, each of the officers required to make out and certify the records of the events to be registered were given by the State Board, and by local boards, such information and such aids in these duties, that at length there is a reasonable certainty of success, both as regards the correctness and completeness of the records, within the jurisdiction of each local board of health, and ultimately in the State Bureau of Vital Statistics.

The State Board of Health, being unwilling that the incomplete and somewhat imperfect records received during the first few months' experience in dealing with local registry offices should be published as the vital statistics of the State, will not publish such returns until all local boards have made fairly complete records for a period of twelve months. This delay is regarded as a duty toward those who would use, or would quote or print these records of life and death either of the whole population, or for any of the civil divisions of the State.

The publication of annual abstracts in each of the three branches of vital statistics, as now provided for, will be possible for the entire State, it is believed, for the year 1884, and for about five-sixths of the civil divisions and population of the State, the records for 1883 may also become available. The practicable uses of these vital statistics require that the areas of each civil jurisdiction, and the total population living in them, shall have their records so completely and separately registered, that it shall not prove a basis of errors, but rather of correct and useful public statement; and that it shall not be chargeable as a fault of the State system, that it supplies incomplete and inaccurate records from cities, villages and towns, whose records of life and death furnish the unworthy basis for erroneous comparisons, deductions and public uses.

This view of public duty of the registering authorities throughout the State has been presented to each local board and its registering officer, and the desired results are now being attained which this board has steadfastly endeavored to secure by all the resources and authority it could bring to bear.

Aids found necessary in organizing and outfitting the local registry service.— 1. It has been found desirable to give to physicians, and all who certify or review certificates of death, a carefully prepared statistical nomenclature, to be used and referred to, for the purpose of securing accuracy and reasonable uniformity in records of mortality. Such publication is about to be given to all who have any responsibility in relation to the duty of certifying or registering the causes of death.

2. To provide for and secure the complete registration of births, it has been found necessary to use all the discretion and authority which this Board can employ, under the laws, to secure properly registered records of all infants that may not have the attestation of professional attendants. As great numbers of mothers, in the hour of maternity, are not attended professionally and must have their newly-born children certified by other means than the statutes have yet provided, this Board's instructions to local boards and registering officers will enforce this duty as far as possible through the local registry offices. In like manner delayed and neglected records are to be collected and publicly registered.

3. Marriage registration, required as an index of the social state of the people in any place, may continue to be a subject of unsettled personal and professional opinion among the ranks of responsible parties, who should regard the law of marriage registry and the subject itself as too sacred to be neglected. The State Board and local boards of health cannot justifiably omit to secure the most complete registration possible in this branch of vital statistics. It undoubtedly will be necessary to make an essential amendment of law, so that there shall be no longer any evasion of the supreme duty of the professional person, who legally declares the validity of the marriage, that is, who solemnizes it, to require that, as a condition precedent to such act, the records of the twain to be married be duly made and witnessed, thus fully to comply with the laws and regulations concerning marriage registration.

This duty being faithfully attended to under any reasonable law, it might never be necessary to have a form *civil* for the marriage ceremonial separately from the form *ecclesiastical*. Though marriage records are not primarily used for disclosing or promoting public health interest, they are fundamentally essential to marriage *as a social state* and to the physical interests and social sanctity of families and homes; and if these circumstances are considered in connection with the biological interests of society and its most essential institution — the family, it may ever be desirable that boards of health in a Commonwealth like ours, be required to supervise and direct the system of marriage registration.

The State has laid the burden upon its boards of health, and until it removes this branch of registration from their care, this view of duty will be everywhere presented and inculcated.

A certain amendment of the statute relating to this class of records will undoubtedly be presented to the Legislature in due time for reasons which will appear in the Board's report upon laws. There may continue to be very faulty incompleteness in marriage registration until certain desired amendments of law shall have been made. All the authority and resources at the command of the State Board are

being brought to bear to secure completeness in each branch of the public registry, as the local boards organize and prepare for work. The few points that will require early attention by the Legislature are here given:

Section 7 of chapter 322 of 1880 requires the State Board of Health to recommend such forms and amendments of law as shall be deemed necessary for the thorough organization and efficiency of the registration of vital statistics throughout the State.

Other statutes have required that every marriage, birth and death which may occur in any town, village or city in the State shall be registered within three days of the event so to be recorded, and that the report or certificate for this purpose shall be made by the attending clergyman, magistrate or physician.

The Board, after succeeding in the organization of the means for local registration at the hands of local boards of health, now needs to secure, through timely action of the Legislature, such amendments of the statutes relating to registration and vital statistics as shall result in making these records as complete and perfect as possible.

No existing law in this State definitely requires that the persons who are first and chiefly responsible for records of birth and of marriage, shall make out or furnish them. It has hitherto been required that the physician who attends at a birth, and the clergyman who attests a marriage ceremonial, shall make and keep a record of the same, and shall give a copy of it when required by certain authorities. No provision has hitherto been made for the taking and preservation of records of birth where physicians are not in attendance; yet scarcely half of the births have a medical attendant and have their records publicly registered. No law has specified who shall send or bring the birth records or certificates to the office for registration. No law has yet required persons who are about to be married, or are just united in marriage, to make out a record of their personal identity and family descent, and the date and place of marriage; and no law has suitably provided for and required the preparation of such a record of the persons to be married, as a duty due from them to the person who is to attest the marriage, and no law has made it practicable for the minister or magistrate to require the husband, or the families of the couple, to file the marriage certificate at the office of registration. No provision has been made, hitherto, for having a personal record of the couple about to be married, filed by them at the office of registration, previous to the solemnization of the ceremonial.

Thus it has been true, but no longer should be, that the statutes have failed to provide the way for making out and registering the records of birth, except as physicians may be pleased to send in certificates of such as they have attended, parents not having been required to give attention to their own duty in this matter. Thus the State has failed to secure complete records of births. Thus, also, the persons about to be, or just being married, having been laid under no requirement of law to cause a personal record of themselves to be made and filed, have not, hitherto, given to the ministers and magistrates who solemnize or attest marriage ceremonials, the means for making complete and perfect records such as the laws require them to make and keep, and also to furnish for public registration. The same record which the couple marrying should be required to file at the office for

registration of vital statistics is precisely the record which the person who solemnizes or attests a marriage should demand as a dutiful precedent to his official act, and which, indeed, under the law of 1873, may be demanded and exacted from them, if need be.

Numerous cases, important in themselves separately, yet most important as indicating a general necessity for the enactment of a brief law, as now proposed, have been brought before local courts during the past year, yet owing to the defect in the statutes which has hitherto failed to define the way in which the certified records should be brought to the registry office, such appeals to courts have failed to secure the desired results, as no general statute has yet defined whose duty it is to transmit these certificates of records to the local registry office. Yet under special statutes applying separately to the cities of Brooklyn and New York, the requirement is peremptory upon professional persons to make and return the certificate due from them. Any neglect to do so is punishable by heavy fines.

All records of death are amply provided for by a general statute, and there will be no excuse for neglecting any duty concerning them. The same registry officer, who registers the deaths will, as a recording officer in the town, village, or city which he serves, make the registry of all records of birth and marriage received by him; and it is with a purpose to secure completeness and perfection in these records, and to relieve the great embarrassment and vexation which ministers, magistrates and physicians now have in regard to the records, that an amendment of law for this purpose is now proposed. The local boards of health being now well organized throughout the State, they and their registry officers are anxious to have such a law as a means of securing complete and perfect records without litigation and without hardship to physicians and ministers.

Recapitulation of Reasons for the Proposed Law to Better Define and Provide for the Registration of Births and Marriages.

1. None of the general statutes of New York, from Colonial times until now, have indicated by whom the facts in the records, to be certified for public registration, shall be furnished.

2. None of the statutes have made it the duty of the family, or other persons that are first in responsibility for the making of a correct record, to cause such records to be made.

3. The Laws of 1830, 1847 and 1880 relating to this subject, more or less directly hold the minister or magistrate, the physician or midwife, responsible for making up the records and attesting them in the cases which they professionally attend; they are simply required to preserve such records and to give a copy of the same whenever demanded. They are under no statutory obligation to file them in any public office.

4. No person or class of persons has been required by any general statute to bring to a public office or officer his attested records of birth or marriage (except in Brooklyn and New York), nor has any statute provided for the reporting of births which occur without professional attendance, or of children by request and attestation of parents or other custodians.

5. Death certificates and all records that pertain to death and burial are amply provided for by the statutes of 1880, 1881 and 1882. (See section 3, chapter 351 of 1882.)

6. Local registry clerks and boards of health, except in the cities of New York and Brooklyn, have no separate or specific provision of statute that will enable them to carry into full effect necessary rules and regulations designed to compel physicians, ministers and magistrates to file at their registry offices the records of births or marriages required for registration, unless, indeed, the courts should, in particular instances, decide that the general power under section 3 of chapter 351 of 1882, "to make the registration complete," would and does carry with it the lawful right to compel such service by ministers, physicians and magistrates who attest such records; yet courts will not generally so decide.

7. The experience of the local boards of health throughout the State, now that they are well organized, has demonstrated during the first eighteen months of their existence, that they do not find it expedient to prosecute at law, or to inflict penalties upon ministers, magistrates and physicians for failure to make returns of marriages and births, which respectively they professionally attend, so defective are the statutes relating to these two classes of records.

8. Investigation and experience have proved to the State Board of Health, and to the local boards generally, that householders and the persons who are naturally first in responsibility for the correct and complete statement of all the facts which are required to be certified and publicly registered, concerning a birth or marriage, can readily be so instructed and aided to do their duty in this matter, and that were a statute so to require, these persons, as here indicated, would cheerfully and faithfully supply the elements of the complete and perfect record which must be attested and publicly registered.

9. The persons who must certify or attest the individual records or certificates should be ever held to their obligation to insure the return and public filing of that which they attest for public registration. In this duty, however, they will elect whatever method will suitably insure the immediate filing of perfected records; and, as regards records of marriage, the primary copy should be already entered at the registry office, while the professional attestation of the ceremonial or solemnization of marriage is to be filed immediately after said event. The husband's and bride's families, and the attestant, must arrange to the complete satisfaction of the last-named person, and he alone can readily be held to the responsibility of not only filing the attestation; but, in case of any loss or wrongful delay of the certificate of his act, he must be required to file a duplicate certificate upon request.

10. Any parent or custodian of an infant that has not had a medical attendant at birth will henceforth be required to observe the duty of registering the record of the child according to the forms of law. However humbly born, every child in the State should have a perfect record so registered.

The duty imposed upon ministers and magistrates who attest or solemnize a marriage, to not only satisfy themselves of the identity of the persons, but of their lawful right to enter upon matrimony, as required under chapter 25 of 1873, and by previous laws, will not be

successfully complied with until the parties about to be married make out the record which is to be publicly registered. Such blank forms of record for use by families, physicians, clergymen and magistrates in this State are always ready at every registry office in the cities, villages and towns, and can be had in every school district in the State. No hardship is imposed upon the persons about to be married, however great their haste, or if it is a "Gretna Green" affair. Every man who appreciates the civil and religious obligations of marriage will be deliberate enough to prepare and file the individual records of himself and his bride previous to the ceremonial and attestation.

The mode of interesting every household in the State is now so complete, through the local registry offices and the State Bureau of Vital Statistics, that no inconvenience will be caused, after six months' preparation in the towns and villages, and two months, as proposed, in the cities. The same blank forms as are now in use, would continue to be employed; and no new offices and no additional public expense (unless for the clerical verification of the ante-nuptial record as offered by the man who is to be married) will be required.

[D.]

REPORT OF THE STANDING COMMITTEE ON PUBLIC INSTITUTIONS.

This committee has continued its investigation in three classes of institutions, namely, the public schools, certain seminaries and colleges, and summer resorts.

The committee finds abundant evidence of the sincere concern of the masses of the people for the sanitary welfare of their school children. Indeed the subject has so grown in interest, in the line of inquiries which have now reached all the villages and rural communities of the State, that much good fruit is already borne; and in several of the cities, teachers and school officers have taken up the questions which were under investigation by this Board a year ago, and the popular view and vote of means have expressed themselves in practical and encouraging terms for improvements in the sanitary outfitting of public school-rooms.

While awaiting further study of the facts, which are now being classified in a statistical way, concerning the present necessities of schools and their inmates throughout the State, this committee begs leave here to present a few illustrations of the interest taken in the sanitary and general improvement of school buildings and their outfitting. This is best presented, first, by two examples of structural completeness in school buildings; second, by a few quotations from returns received at the central office of the Board during the past year, the necessary limits of space in the report requiring this brevity on the part of the committee.

The improved school buildings in the city of Auburn. — The first school board which took up the line of inquiry pursued by the State Board was that of Auburn; and as it invited, through its committee on school buildings, whatever counsel this Board would give, the President of the State Board, with Dr. Lincoln, then serving as an expert inspector, entered into the conference.

The annexed plan exhibits some of the essential results of these counsels, the first building being now nearly finished, and the improvements in ventilation, lighting, sittings and the allotments of space generally throughout the building, have been provided in accordance with the decisions that were made upon these essential sanitary objects, for which this Board's advice was sought, as shown in the following letter:

AUBURN, N. Y., *March* 15, 1883.

To the Secretary of the State Board of Health, Albany, N. Y.:

DEAR SIR — You will please find inclosed, diagrams of the Madison avenue school, which has been completed this winter. Green and Wicks of this city, architects.

We are greatly pleased with it in all respects, and especially with the lighting and ventilation. The building is entirely constructed of brick. Not a stick of wood was used in building the partitions, and as it stands on thick walls below, we have not noticed a crack or any settling in the building.

The plastering is finished smooth. There are four large school-rooms, each accommodating fifty scholars, and being twenty-four by thirty-five feet inside, and twelve feet high, thus giving two hundred and one cubic feet of air space per seat. There are seven large windows on the long side, and two in the rear of each room three feet from the floor and within six inches of the ceiling, giving a large span of light to the floor area, and lighting the room thoroughly even on dark days.

The ceilings are of painted wood and floor of narrow maple, laid on a lining floor with deadening felt between, to prevent noise and air passing.

The second floor has a double set of joists, one carrying the ceiling, and the other and heavier carrying the floor.

The building stands high, giving good ventilation and light to the basement; the roof is of slate and laid in felting. The building has two stair-cases to separate sexes; two cloak-rooms for each room, all doors opening out, front door and vestibule door double-swing. Stair-cases commence to ascend directly opposite front door, four and one-half feet wide, half way up being a large platform extending entirely across the hall, thence to second story; second story arranged exactly like the first.

The heating is done by steam with both direct and indirect radiation, the greater amount of the heat coming into the room through a warmed air shaft from indirect radiator in basement 1′ 6″ by 2′ 0″ and let into the rooms about six feet from the floor, these openings being covered by fine wire screen without the usual frame.

Each room has its own radiator in the basement, which is supplied independently from out of doors through a fresh-air chamber in the basement. There are also coils of pipe arranged under the windows of each room to turn on heat in case of need in very severe weather. The vitiated air is taken from the rooms at the floor-level by a flue 2 x 2 feet and each one conducted separately to top of chimney. These four foul-air shafts are grouped about the cast-iron smoke flue from furnace, twelve inches in diameter, which heats same and increases the draft of these flues. By hanging a thermometer on each of these air ducts, on March 11, 1883, with a strong west wind, the air was entering at an average temperature of 112 degrees and passing out at sixty degrees, while the temperature of room at teacher's desk was seventy-two degrees. This was not taken during school hours. The air was passing out with great rapidity, not having an anemometer velocity, could not be determined, but it was sufficient to hold any article, like the cover of a book, against the wires. The cost of this school complete, exclusive of steam, was $10,300.

This spring the board determined to build another, following as nearly as possible the model of the Madison avenue school, for Evans street, but to reduce the cost to $8,000. To accomplish this purpose all architectural effect was abandoned, and our aim has been to get a brick building, with the same thorough lighting, heating and ventilation as was found in the Madison avenue school. The architect went to work, using nearly the same plan, reducing the number of windows, but making them proportionally larger. Small glass was used, as being more economical than large, the extra floor joist to carry first story ceiling was abandoned, and several minor changes on the exterior stone and brick work. The room in each floor was reduced to eleven feet, and every thing was done to economize, but keeping in mind the real essentials; the result is inclosed.

The rooms are arranged almost exactly like the previous example, and the ventilation and lighting is to be carried on in precisely the same manner, except as to the warming, where we may make some few changes. The indirect radiators will each be supplied directly from the exterior, and have an automatic valve to close and open as the wind may vary. There will be a much larger boiler to enable us to carry a lower pressure of steam and do the work more easily.

This school has been contracted for $8,000, exclusive of steam heating, which will cost $800.

The schools are so arranged, that furnaces may be used, but we are greatly ie favor of steam by the indirect method. Where so many are in one room we find the air is much better.

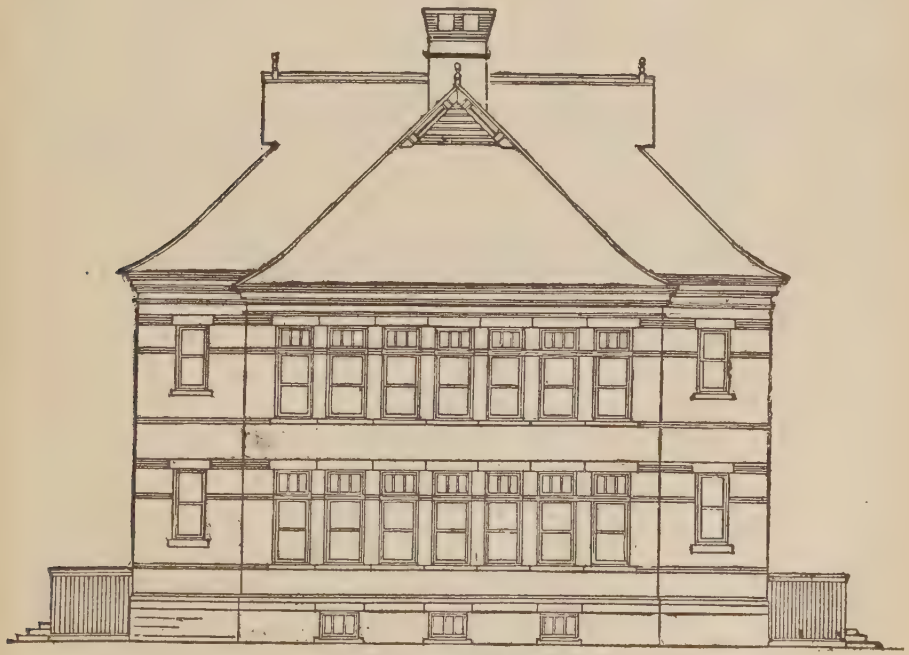
By the exenditure of a very few dollars, very handsome exterior effects can be arranged for these buildings and greatly improve their appearance, for instance by adding a bell tower, etc.

The cloak-rooms in each case have windows high up, to allow of hanging space all around, wainscoted five feet high, double rows of hooks. The doors to cloak-rooms cut up two inches from floor and have transom to open overhead, thus securing good ventilation.

In the Madison Avenue school the cloak-rooms are not heated, they will be in the Evans street, to dry clothes. There is a large radiator in the lower hall of each.

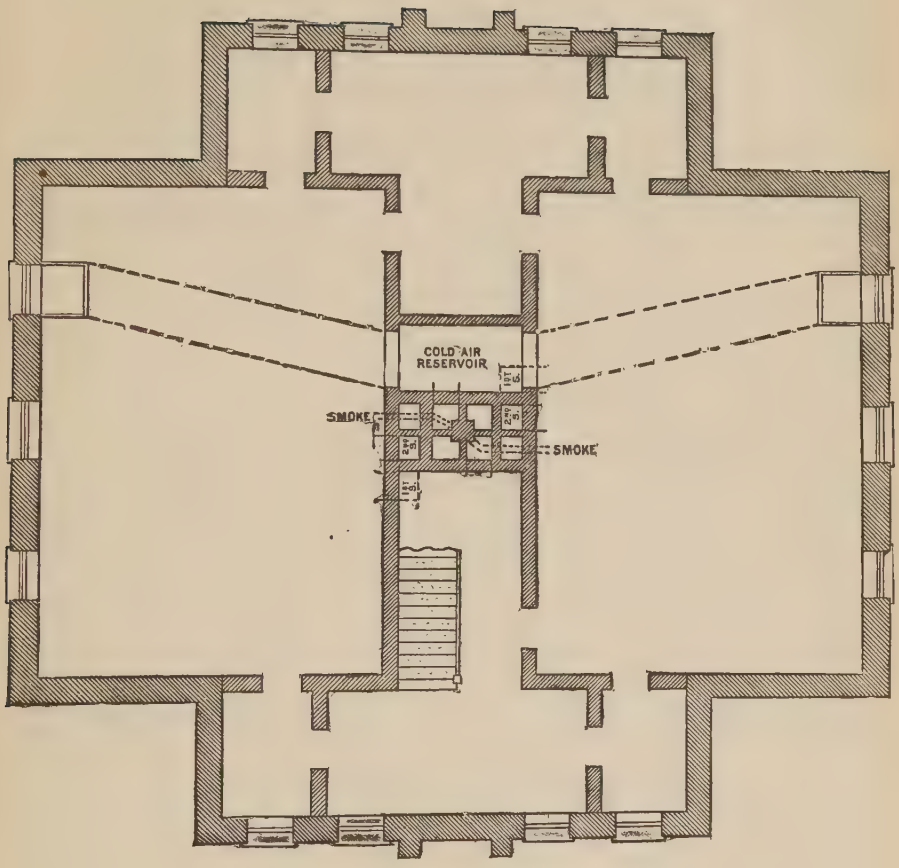
Auburn Public School Building, Madison avenue.

FRONT ELEVATION.

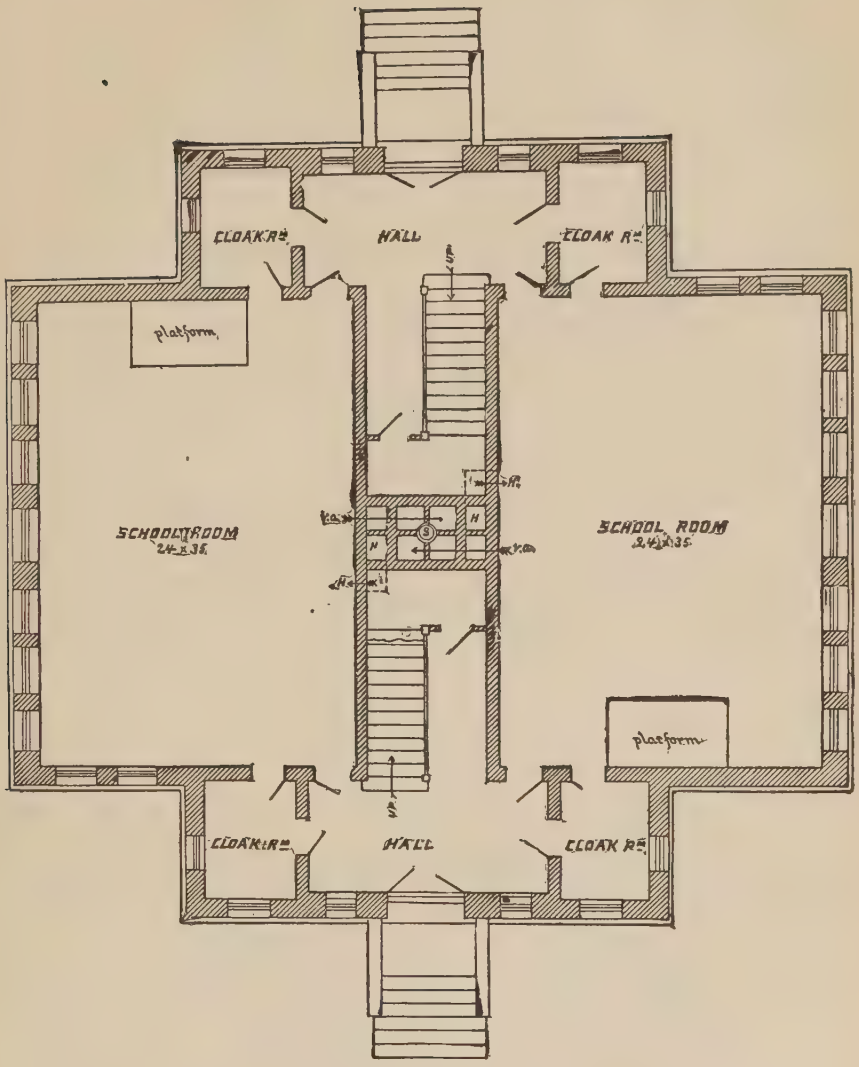


SIDE ELEVATION.

For 3d Report State Board of Health of New York.



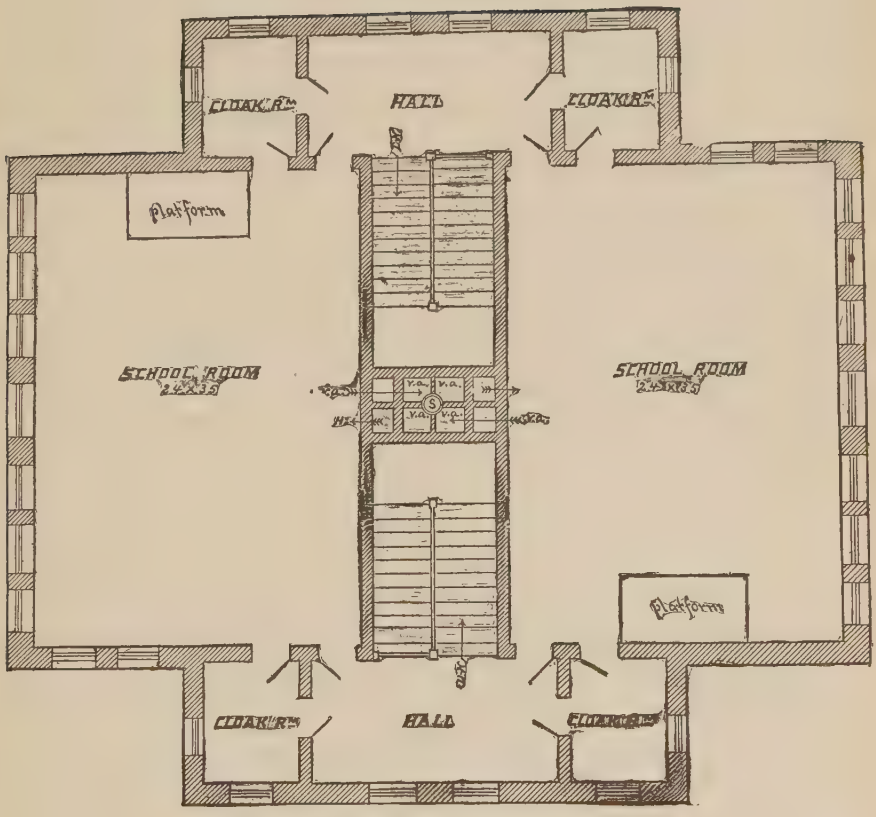
BASEMENT PLAN.



FIRST FLOOR PLAN.

GREEN & WILKS, Architects,
Auburn, N. Y.

PUBLIC SCHOOL,
Madison Avenue, Auburn.



SECOND FLOOR PLAN.

PUBLIC SCHOOL,
Madison Avenue.

The schools should be provided with double windows to prevent the waste of heat. All the rooms and halls are wainscoted to the bottom of the windows. There are also many little points and conveniences skillfully arranged by the architect which need not be described here.

Very respectfully,

CHAS. L. SHELDON,

Chairman Building Committee.

School buildings of Elmira.— The school buildings of Elmira consist of five structures upon the same general plan.

[Outlines of these plans have been submitted to the State Board of Health, but are too elaborate for reproduction in these pages. They illustrate the practical value of simplicity in school-house structures and the importance of making a more studied provision for lighting of some of the school-rooms.]

Superintendent Tompkins concludes his report with the following remarks.

"A general answer in regard to our treatment of contagious diseases, questions 63 to 68, is as follows:

"In accordance with the State law for vaccination, a sanitary superintendent has been employed by the Board for several years whose duty it is to examine the pupils in the schools frequently with reference to vaccination. No pupil is admitted into the schools unless provided with a vaccination certificate from a regular practicing physician. This is the duty of the teachers and has been rigorously adhered to for several years. In regard to other diseases, scarlet fever and diphtheria, every precaution is taken against exposure. The cases are immediately removed from the school, as are also the pupils from the same family. It is the practice of the physicians of the city to give notice of such cases to the sanitary superintendent and to the school. The care that has been exercised in the sanitary regulations in our schools has gained the full confidence of the people. Physicians of good standing assert that our escape from small-pox is due largely to the continued practice of vaccination in the schools."

Under a recent date Superintendent Tompkins has favored this Board with the following statements based upon the conclusions published in the second annual report of the State Board of Health, and issued in the Board's series of papers [No. 43 a.]

"I give the result of my observations upon points named in the State Board's circular [43 a.]

In regard to school structures, our authorities are giving more attention to the construction of school buildings, with reference to the health of the inmates, and have recently made alterations in buildings that had stood unaltered for several years. Referring to diagram of school building, (primary) recently finished, which was sent with my report, and to which Dr. Lincoln's attention was called at the time of his visit, you will observe that especial pains were taken to secure the best ventilation, light, closet accomodations, etc., to which has lately been added two finished rooms in the basement, easy of access, for play-rooms; having also roomy play-grounds around the building. We have introduced in all of our buildings a system of ventilation from

which we are receiving good results. The plan is to concentrate flues leading from the floor of the rooms to the attic, into a small room in which is placed a large stove, a large ventilator leading from this room out through the roof. The furnace supplying the pure air warmed. This system of ventilation secures a saving in fuel of ten to twenty per cent, also a greater uniformity in heat, as it makes the circulation constant, avoiding overheating the air, by having circulation through the furnaces interrupted, and sometimes caused by pressure in the rooms from high winds forcing the air into the room or building through openings around the windows. This ventilation exhausts the air from the rooms, creating a partial vacuum. In addition we use the windows and doors so far as we can without exposure; doing this at recess and other times when the building is not occupied, and also instruct our teachers in using the means for ventilation and also, to experiment with the various conditions of the air and temperature. This is important from the fact that *ignorance or carelessness on the part of the teacher in charge can neutralize the best appliances that can be devised.* The variable condition of the air in different locations and in the different rooms of the same building; the effect of different temperatures, both outside and inside, upon the circulation of the air, all point to the necessity of the teacher in charge having an intelligent understanding of the principles governing ventilation and of the appliances used to effect it.

"Overcrowding is an evil which it seems difficult to avoid, particularly in the cities that are growing, as these wants will not be anticipated. In graded schools there will at times be in certain departments an influx that it is impossible to provide for at the time needed. This is an unfortunate state of things, as there is probably no more serious evil, or one from which more harm can come, than this of placing too great a number in a room, as it renders ineffective any ventilation; appearing to destroy its operation to a certain extent, there being a want of the space required for a sufficient circulation of air to make the necessary changes.

"The next question under consideration, that of school-house privies, in many cases is not only an evil, but a disgusting and degrading one as stated in the report (paragraph 5, circular [43a]), the extent of which is but little known to the public at large. The difficulty in reaching it appears to lie in the delicacy of not only teachers (which is natural), but in the parents, in not observing and instructing their children upon a proper discharge of duty in attending to the 'calls of nature' with regularity, cleanliness, privacy, etc. The modesty of many pupils, as well as teachers, prevents familiar conversation upon this topic as in other matters, hence the abuses are continued. In many cases the discomfort attending the duty prevents proper attention to it, and a consequent effect upon the health, while on the other hand, an attempt at bettering the accommodations meets with abuse. Whether from a lack of proper moral training or contact there is often a want of care and common decency with those from whom better things are expected. There is no doubt that the close association rendered necessary by limited conveniences has a contaminating influence upon the morals, from the fact that there will always be in a promiscuous assemblage of children many that are both physically and morally

filthy, and this pervades both sexes. The separation should not stop with the sexes, but should at least separate, in addition, the primary pupils from the older classes. In this connection may be considered the point referred to in paragraph 10 circular [43a], as relates to school-recesses; it is believed by those having immediate charge, that a large portion of the immoral practices growing out of the association named are due to the morning and afternoon recesses. From necessity a large number are thrown together at these times, and in undue haste. it is claimed, and experience has proved when the experiment of no recess, A. M. and P. M., has been tried, that these duties may be attended to without confusion to the school, and where perfect freedom is allowed. Upon the merits of this question alone (no recess) I am inclined to the belief, from the results in our schools, that there are many things in its favor, and with appliances for ventilation and proper care in this respect, there can scarcely be an objection. This does not apply to the primary classes, as frequent recreation is given in the way of calisthenics, marching, etc., and out-door exercise when pleasant. Our school authorities are providing play-rooms in the basements for these classes, already having several. I have already extended this paper beyond what I anticipated, particularly that portion in relation to privies, but was prompted to do so by some recent investigations made with reference to these accommodations in our schools, and their baneful effect when located in the basements of school buildings without proper ventilation, and the further question whether they can be sufficiently ventilated to be absolutely safe, using them in connection with, water. In our investigations we were prompted to go beyond the mere question of health, comfort, etc., and consider the moral aspect of the case. Our teachers guard carefully the conduct of their pupils as to morals and manners, and in their intercourse as far as possible, which exerts a restraining influence, but it cannot be constant, and we believe it incumbent upon those providing our school accommodations, to close, as far as possible, all avenues that will admit of or create immoral habits and practices, as well as to provide for physical comfort.

"In regard to paragraph 14, there appears to have been in the past but little regard paid to light and the location of pupils with reference to it, and not only pupils but teachers, as there is no doubt that many teachers have suffered also. Pupils receive the first consideration, being more susceptible and in a more fixed position. We are fully aware of these difficulties and are making the changes, having already within three years made many. It is important that teachers investigate the condition of pupils' eyes, particularly with reference to short-sightedness, which parents do not always discover. Pupils become debilitated through these defects. It is our intention to investigate color-blindness in order that the pupil may not select a vocation for which he is incapacitated by this defect.

"The system of vaccination and protection against contagious diseases has been carefully followed and carried out, from which, so far as small-pox is concerned, it is claimed we owe our immunity from the disease. In my suggestions I have doubtless made many with which you are familiar, and have not made any effort to avoid them. In fact I feel that I have said considerable and added but little at best, but

will make no farther apology except for the hasty and crude manner in which subjects are considered. I have endeavored to confine myself to the practical aspect of the subjects, without, as stated, advancing any theories.

"I agree fully with the conclusions expressed in the circular."

Respectfully yours,

(Signed) C. B. TOMPKINS,
Superintendent.

There is abundant evidence that the people throughout the State are quite willing to bestow the necessary means — and indeed extraordinarily liberal expenditures — upon the desired improvement of school buildings. A fact germane to this needs to be equally well settled, and the committee thinks it will be, whenever properly presented to the tax-paying inhabitants of the towns, villages and cities. It is this, will the school officers accept, and will the people defray any necessary cost for, the sanitary supervision which schools, seminaries and colleges of every grade require?

This committee and the entire Board will doubtless ere long be expected to advocate and aid the favorable consideration of this duty for the people of the State. There is no doubt that in the cities and large villages this duty should without further delay be undertaken as a part of the legitimate and most necessary service of the local boards of health. Regarding this as a settled fact, it matters not whether such supervision be by an officer who performs no other labors whatsoever — and who may for that matter be attached to the Department of Public Instruction, in cities at least, to be supported out of its funds, or be attached exclusively to the municipal board of health, the sanitary inspection and care-taking of the schools have become an absolutely indispensable duty, and this duty is binding, first upon the local board of health, whatever school boards may do or neglect to do.

During the past two years there have been investigations not only of private schools, but of colleges and universities within the State of New York, by officers and experts acting for this Board, and results have been acquired which may not justifiably be published by any authority. Improvements and reforms have followed, and must in all such cases rapidly follow such investigations; yet whenever a house epidemic, or any excessive sickness or mortality occurs in any school or college, this committee seriously doubts if the responsible officers of such institution should object to the publication of the record of the causes of the calamity suffered. Princeton College is to-day all the stronger and more frequented, the country over, for the full exposure of, and the faithful remedy for, the sources of the calamity it suffered a few years since. The same is true of the old Virginia University, and would have been true, had a like policy prevailed, at the Maplewood Female College in Massachusetts, and at various institutions in the State of New York which have suffered a just decadence for omitting to do this.

The committee has, however, broken no confidence, has certainly advised faithfully, and has been met by prompt and creditable response, to its suggestions for improvement in the sanitation of school

structures and their outfitting; and whenever the kind of general supervision suggested shall have been secured, there will be little liability to disastrous continuance of the evils which threaten life and health in the schools.

[E.]

REPORT OF THE COMMITTEE ON QUARANTINE.

Throughout the civilized world the quarantine system and its present outfit of artificial islands, two miles off shore, with ample hospitals and a floating boarding-station near the open sea-way, are justly mentioned as worthy the great port and commerce of New York. These facilities for securing the sanitary protection of commerce and of the most crowded entrepôt of emigrants, are the legitimate results of more than a hundred years' of experience. The progress of medical and sanitary knowledge has served to simplify and render more and more efficient these quarantine safeguards of the port of New York, which are, indeed, safeguards of the western continents, and to relieve the commerce of the seas from needless cordons and burdens which, in earlier times, pressed heavily upon maritime trade and the free movement of travelers by sea.

The orders or edicts in council at the port of New York, such as were promulgated in 1702, 1714, 1716 and 1742, "to prevent the importation of small-pox and malignant fevers from the West Indies, and their spread in the provinces;" the Colonial Laws of 1755 "to prevent infectious distempers being brought into this colony, and to hinder the spreading thereof," and all the laws which followed in 1773, 1775, 1784 and 1799, prepared the way for that long series of experiments in the sanitary supervision of vessels, cargoes and passengers which in the course of seventy years during the present century has resulted in the present greatly improved system. The medical facts concerning the portable and pestilent infections and contagions, and the maritime and naval practices and conditions by which such perilous poisons are bred and communicated, seem, at length, to be so clearly settled that the interests of society, as affected in such matters, may be protected with great certainty. The controllable conditions of sanitary safety are found to be comprised under the same heads as apply in the public health service of towns and cities, namely, the inspection of all sources of infectious disease, and the complete destruction of contagious and infectious matter, the cleansing and other necessary policing of ships, of passengers and of unwholesome cargoes, and the adoption of adequate preventive measures against liabilities to small-pox and every lurking exposure to pestilent disorders.

In pursuing the duties of the State quarantine service the labors are divided into those of the lower quarantine station, at and near the artificial island several miles below the Narrows, fronting the open sea-way; and those of the ordinary or upper station between the

Narrows and the commercial anchorage region of the upper bay and harbor of New York.

REPORT of Lower Quarantine for 1882. (*From June 15th, to October 8th.*)

INFECTED PORTS.	Number of vessels arriving during the period of infection.	Number of vessels with sickness.	Number of Sick.			Number of Deaths.		
			In port of departure.	On passage.	In quarantine.	In port of departure.	On passage.	In quarantine.
Aspinwall	7	2	3	2	6	.....	1	1
Cardenas	9	.....	.....	.....	.....	.....	.....	.....
Cienfuegos	5	.....	.....	.....	.....	.....	.....	.....
Havana	71	19	34	4	8	11	1	3
Matanzas	22	1	2	.....	.....	.....	.....	.....
Neuvitas	3	.....	.....	.....	.....	.....	.....	.....
Port au Prince	5	.....	.....	.....	.....	.....	.....	.....
Rio Janeiro	1	.....	.....	.....	.....	.....	.....	.....
St. Jago de Cuba	5	.....	.....	.....	.....	.....	.....	.....
Sagua La Grande	16	.....	.....	.....	.....	.....	.....	.....
St. Domingo City	3	3	.....	9	5	.....	3	.....
Vera Cruz	7	.....	.....	.....	.....	.....	.....	.....
Pensacola	2	1	.....	8	3	.....	1	.....
	156	26	39	23	22	11	6	4

Total number of vessels inspected at the lower quarantine during the summer and fall of 1882 was 952.

During the year 1882 the number of vessels arriving from foreign ports and inspected at the New York quarantine was 6,650.

The number of vessels arriving from domestic ports south of Cape Henlopen (April 1st to November 1st) and inspected was 2,567.

Total number of vessels inspected at the New York quarantine during the year 1882 was 9,217.

The number of vessels arriving with contagious or infectious diseases was 192.

The number of cases of disease of a contagious and infectious character, discovered on board of vessels, was 879.

Of this number there were, of yellow fever , of small-pox, fifteen cases on transatlantic passenger steamers, on vessels from other ports, principally from Port au Prince, nine cases; of other cases of contagious diseases, other than yellow fever and small-pox, there were 794.

The number of deaths on shipboard in transit to the port of New York was 495. The number of births in transit, 162.

Yellow fever.— The number of cases of yellow fever on vessels arriving at this quarantine during the summer of 1882 was exceptionally few, as compared with the number in many previous years. The same comparative immunity from the ravages of the disease has existed among communities in its habitat in the West Indies. In Havana the death-rate from yellow fever was for a considerable period during the summer months of 1880, upwards of seventy per week. For the week ending July 16, the number of deaths was twenty-two. This proportion of deaths would represent an aggregate number of cases prevailing at Havana during three months of upward of three hundred.

The greatest number of deaths at Havana during any week the past season was sixty-one (July 22). This continued but two or three weeks and fell to fifteen the week preceding August 19; the latter part of August, and during the entire months of September, usually the months in which the harvest of death from this cause is greatest, the number did not exceed eighteen per week.

In localities where, as in Havana, and other parts of the West Indies, yellow fever finds a congenial home throughout the year, and conditions which, during portions of the year, favor its development until the proportions of an epidemic in greater or less degree are reached, it would be both interesting and instructive to have a series of carefully conducted hygrometric and thermometric observations made in connection with a record of the direction and intensity of wind currents.

May 17, 1882. The steamship *City of Washington*, Vera Cruz, 4th; Progresso, 8th; and Havana, 12th, reported one death at sea. The deceased was a steerage passenger received at Progresso, and taken sick soon after leaving Havana. The disease as indicated by the symptoms given by the acting surgeon of the steamer was unquestionably yellow fever. From the history of the case it is evident that the victim had been affected before he came aboard the *City of Washington*. The quarters occupied by the man and all clothing in the same were disinfected, and the steamer was given *pratique* the same day.

June 28. The brig *Trust* arrived at Quarantine from Havana June 5. This vessel entered the port of Havana May 3, and went May 5 to Tallapiedra wharf, an infected locality, to discharge. May 16. Two men were taken sick with yellow fever. May 19. The vessel left the infected wharf and went into the open bay. Between this date and May 30, while yet lying in the open bay, four men were taken with the same disease. May 22. The man died who was removed to the hospital the 16th. The first and second mates were among the sick mentioned, and neither of these had been on shore after the vessel left the infected wharf. The brig was ordered to the upper bay to discharge by lighters.

The steamship *City of Washington*, from Vera Cruz and Havana July 8, arrived at lower quarantine, July 12. Magdalena Costa, a sister from the Convent of the Good Shepherd, came aboard the steamer at Havana. On arrival at quarantine she was sick with yellow fever. The patient was immediately transferred to the hospital at Swinburne Island. The symptoms on admission indicated a fatal termination. The patient died the morning of the 14th. This woman came directly from the convent of the sisters to the steamer. There were and had been no cases of yellow fever in the convent. The infection in this instance was doubtless received on the way from the convent to the steamer, either on the street or at the wharf; the case is interesting chiefly as another proof that sanitary conditions may be secured in limited localities like that of the convent in Havana, which bid defiance to the admission of one of the most virulent infections although intensified by the most favorable conditions for its propagation.

The brig *Mary E. Leighton*, eleven days from Havana, arrived at lower quarantine July 15. This vessel went into the open bay at Havana, June 8, after discharging at an infected wharf. On the

23d, Captain Leighton was taken sick with yellow fever. July 4, the brig sailed for New York. On the 9th, Hans Tallaken, a seaman, was taken sick of yellow fever and on arrival was removed to Swinburne Island hospital, but died during such removal. With the exception of the captain, none of the officers or crew were on shore after the vessel went into the open bay. The inference in this instance is, that the mate and seamen were infected from the lighters that conveyed cargo to the brig, or from the atmosphere of the bay. Had the ship been infected so as to communicate the disease to those of the officers and crew who sickened, others of the officers and crew subjected to the same exposure would in all probability have been attacked; whereas, after the incubative period (five days) had passed after leaving port, no cases occurred. Although not convinced that the *Mary E. Leighton* was an infected vessel, prudence required that she should discharge her cargo in quarantine, and be cleansed and disinfected before going to her dock in the city.

September 1. The bark *Anna Reed* arrived at lower quarantine from Pensacola, August 11. Seven days out, the cabin boy and a seaman were taken sick, but were convalescent on arrival. August 19, John Langdon was taken sick and recovered. August 20, Peter Peterson became ill and died the 25th. August 21, Seaman John Burn was taken sick, and on the 27th, Henry Kinney; both were convalescent on arrival.

John Black and John Verne were taken sick September 1, the day the vessel arrived at quarantine, and were immediately removed to the hospital at Swinburne Island. The first named of these men speedily developed well-marked symptoms of yellow fever, while the latter had intermittent fever with daily paroxysms.

Much to the surprise of the quarantine physician the third day after the admission of Verne he suffered a prolonged exacerbation; the fever thermometer indicated 104, the sclerotic was intensely injected, the urine, hitherto free and without a trace of albumea, speedily became scanty and albuminous. The patient was immediately removed to another ward, and the case was treated as yellow fever. Before the termination, both of these patients exhibited the icteroid peculiarity of this disease in a marked degree. Both of these cases recovered. The vessel was treated as if infected. There was no means of proving or disproving the captain's statements, that there had been no sickness on the bark en route from Havana to Pensacola or while at that place.

The peculiarities of this epidemic of yellow fever at Pensacola and on the Rio Grande, during the summer of 1882, though not properly within the scope of this report, are deserving of brief mention.

The origin of this disease at Pensacola has not been satisfactorily determined so far as ascertained by the writer. Its appearance at Matamoras and Brownsville on the Rio Grande was nearly simultaneous with its advent at Pensacola. It is believed to have been introduced into those localities by returning railroad employees, who came from interior localities in Mexico, via. Vera Cruz and Tampico, where it was prevailing. The first cases occurred about June 29, in Matamoras. It was not until July 29 that a quarantine was enforced by

the authorities at Brownsville against Matamoras, too late to prevent the disease reaching the former place.

The disease, from the beginning to the end, was exceptionally mild in its type. The infection advanced along the localities it invaded with unexampled slowness; but it showed little respect for persons. All were made its victims, the acclimated and the unacclimated; those who had passed through epidemics of the disease in other localities, in an equal degree with recent residents and the transient portion of the communities. The disease continued until the material in the remaining population was exhausted, maintaining its mild type to the last. The mortality at Brownsville was about 7.5 per cent, and at Pensacola very nearly 10 per cent. It is not easy to determine the cause of the prevailing mildness of the disease, in view of the fact that the sanitary condition of these localities invited a much more virulent type; particularly in Matamoras, where the filth and habits of a considerable portion of the population seemed to supply all that was necessary for the development of the most fatal form of the disease. The fever was much more fatal at some interior localities in Mexico, as at Camargo and Mier, than in Brownsville or Matamoras; owing perhaps to the need of proper attention and treatment for the sick.

Small-pox— Early in the present year the bills of health from Port au Prince indicated an epidemic condition of small-pox at that place. All the baggage of passengers from that port was, therefore, disinfected on arrival at quarantine, and the passengers themselves were examined as to their protection from the disease by vaccination, and such as were not considered sufficiently protected were vaccinated by the medical officer on duty at quarantine. It is estimated that not less than five thousand persons perished of this disease during the epidemic.

January 11, 1882. The British steamship *Andes* arrived from Port au Prince, December 14, and other Haytien ports at subsequent dates, with one of her crew suffering from small-pox in an advanced stage. The crew, numbering thirty-one, had been vaccinated on board soon after the development of the case. Examination of the crew showed seventeen successful vaccinations. The fourteen in whom the results of vaccination were not apparent were re-vaccinated, and sent to Hoffman Island for observation for a time sufficient to complete fourteen days from the last possible exposure.

January 13. The brig *Ida*, from Port Liberty, December 15, and Cape Haytien, the 22d of the same month, on inspection was found to have one case of small-pox in the thirteenth day of development. The crew of nine men were vaccinated and detained until successful results were obtained from the vaccination.

January 17, 1882. The British bark *Franklin* arrived from Cape Haytien, December 30. On the sixth day out, Neil Hansen was taken sick with small-pox. The case was immediately sent to Riverside Hospital, Blackwell's Island. The vessel disinfected and the crew vaccinated. The vessel was detained until the 22d; in the mean time seven of the eleven vaccinated proved successful; the four in whom no evidence of success was secured, had signs of previous successful vaccination, and it was presumed were not susceptible to the *vaccinia*.

January 27. The Belgian steamship *Belgenland*, from Antwerp, Jan-

uary 14, with three hundred and twenty-eight passengers, arrived at quarantine, having on board one case of small-pox, which had been early and properly isolated. The case was sent to hospital, the passengers and crew were vaccinated, the vessel disinfected and *pratique* given.

The White Star steamship *Republic*, from Liverpool, arrived the 5th of February, with one hundred and eighty-eight steerage passengers, one of whom had *varioloid*. The case was removed, the passengers and crew were vaccinated, the hospital of the vessel thoroughly disinfected and clearance given.

The brig *Ariostos*, from Hayti, January 27, arrived the 8th of February, with one man sick with small-pox. The case was sent to hospital, the crew were vaccinated, the vessel disinfected and *pratique* given.

February 15. The steamship *England*, from Liverpool and Queenstown, the 1st and 2d of February, had one case of small-pox, a woman aged 23 years, who was received on board at Queenstown. The patient was isolated in a hospital located on the main deck, the first day of the appearance of the eruption. The case was removed to hospital, the passengers and crew were vaccinated, and the vessel was disinfected and discharged in a few hours after arrival.

The schooner *Louisa A* arrived March 1 from Port au Prince and Gonives, and reported the mate sick with small-pox the 5th of February. The 9th of the same month he was removed to hospital at Gonives. Disinfection was attempted at the last-named port, but it was feared was not thoroughly accomplished.

The vessel was, therefore, detained twenty-four hours and was fumigated with sulphurous acid gas.

March 8. Charles Austin (colored) was removed from the Seamen's Retreat hospital, at Stapleton, S. I., by the quarantine steamer "*Governor Fenton*," to Riverside hospital, Blackwell's Island, suffering from *typhus fever*. This man came to New York by the British bark *Trossacks*, February 20, from India, 110 days out. The sanitary condition of this vessel when it passed quarantine was good, and the history of the officers and crew gave no evidence of the presence of any contagion. The inference is that after reaching New York he was infected at some of the lodging-houses in which the contagion of typhus was known to have existed.

The steamship *Alene* arrived at quarantine the 11th of March from Port au Prince, and the brig *Lettitia* from the same port March 13, the former with one case of varioloid and the latter with one case of small-pox. After removing the cases to hospital, and the usual disinfection of the quarters occupied by the patients, the vessels proceeded without further delay.

Also on the 13th of March the steamship *Belgenland* arrived from Antwerp February 25, with seven hundred and twenty passengers, one of whom, a child of seven, had varioloid. The child had been successfully vaccinated when an infant. The usual protective measures were adopted and the steamer was discharged.

March 27. James Dunbar, seaman, aged twenty-four years, vaccinated in childhood, suffering with small-pox, was removed to hospital

from the National steamship *Holland*. The ninety-four passengers in the steerage and the crew were vaccinated and the vessel was disinfected.

April 12. The steamship *Wisconsin*, from Liverpool, the 1st, arrived at quarantine and reported all well. Richard Smith, lampman on the *Wisconsin*, aged sixty-three years, was sent to St. Vincent's hospital the day after he arrived. Three days subsequent to his admission to St. Vincent's he was transferred to the contagious hospital at Blackwell's Island with well-marked symptoms of typhus fever. On inquiry it was ascertained that he was doing duty when the vessel passed quarantine and had not reported as ill to the surgeon of the steamer. The presumption is unavoidable that the contagion was received before leaving Liverpool and was yet latent when he arrived at quarantine.

The steamship *Cimbria*, with eight hundred and fifty-five passengers in the steerage, arrived April 13, from Hamburg, March 29. A child, aged six months, was sick with small-pox. It had been isolated the 4th, the day previous to the appearance of the eruption. Passengers and crew were vaccinated and the vessel disinfected after the removal of the patient to hospital.

The steamship *Anchoria*, from Glasgow, April 10, with eight hundred and eighty-five steerage passengers, arrived April 24 with one case of small-pox, Mathilda Hansen, aged twenty-five years. The case was isolated the first day of sickness. All steerage passengers were examined and with few exceptions vaccinated.

The steamship *Lake Champlain*, from Liverpool fourteen and one-half days, with three hundred and six passengers in the steerage, arrived April 27, with one case of small-pox. After removal of patient, vaccination of passengers, and the usual disinfection of ship's hospital, *pratique* was given.

The coasting steamship, *Richmond*, from Norfolk and Richmond, Va., arrived May 10, with one case of small-pox. The sick was removed, the crew were vaccinated, the steamer's hospital quarters were disinfected and *pratique* was given.

May 20. The steamships *Assyrian Monarch* arrived from London, the *Donan* from Bremen, and the *Gellert* from Hamburg, the former with two cases of small-pox, and the others with one case each, and an aggregate of two thousand nine hundred and eighteen immigrants. All were examined, and such as were insufficiently protected by previous vaccination were vaccinated, the sick were transferred to the contagious disease hospital at Blackwell's Island, and the hospitals were disinfected in season to allow the vessels to reach their docks the same day.

June 3, 1882. The steamship *City of Paris* arrived from Liverpool and Queenstown, May 23 and 24, with fifteen hundred and one steerage passengers. The ship's surgeon commenced examining passengers immediately after leaving Liverpool and vaccinated two hundred. The remaining number, thirteen hundred and four, were considered by the surgeon to be sufficiently protected by previous vaccination. The surgeon observed on the 24th, the day after their coming on board, that two passengers taken at Liverpool gave evidence of an eruption

which he diagnosed as varioloid. These persons, named Peter Unguist, aged thirty-one, and Carl Langren, aged eleven years (Swedes), had good vaccination cicatrices, both having been vaccinated in early childhood. These cases were immediately isolated in a hospital on main deck, until the 31st, when the eruption had disappeared and the patients so wholly free from any evidence of disease, as claimed by the surgeon, that they were discharged from the hospital. On arrival at quarantine three days later, there were no evidences or traces of an eruption. It is probable that they were cases of varicella; but the ship's surgeon stoutly maintained that they were cases of varioloid. If they were *cases of varioloid* the dismissal was so early from hospital, and there having been no disinfection of clothing, there was great danger of the cases infecting other persons in the steerage after their dismissal. The passengers consequently were all examined at quarantine and twelve hundred of them were vaccinated, all being subjected to vaccination but children with good evidence of previous vaccination, and the vessel was given *pratique* after being disinfected. If the surgeon was correct in his diagnosis the vaccination of those who had been infected by the dismissal of the patient from hospital without proper care would, in all probability, prevent the development of the contagion, as the *vaccinia* would anticipate the development of the contagion. Of the two hundred vaccinations by the surgeon, not one case was found to have been successful.

Other instances of cases diagnosticated as small-pox by ship's surgeons and their discharge from hospital before reaching quarantine have occurred. It is not often in such cases that the clothing, bedding and rooms occupied by such persons have been efficiently disinfected. Indeed the ignorance of some surgeons as to the measures necessary to secure satisfactory disinfection is surprising. One ship's surgeon assured the Health Officer that he had disinfected the quarters occupied by a patient ill with a severe type of the disease, by sprinkling carbolic acid powder around the room — a patent so-called "disinfectant," of no value whatever except to disguise, by its strong and characteristic odor, other disagreeable smells. Another surgeon, on being asked if he had sulphur on board to disinfect his hospital from which a case of small-pox had been removed, assured the Health Officer that he had a sufficient quantity; on being asked the amount available for that purpose, he promptly replied, "about half a pound."

In a great majority of cases, the sick of this disease are judiciously isolated, but in a few instances the attendants, or family of the patient, are not sufficiently guarded to prevent their frequent communication with fellow passengers after ministering to the wants of the sick.

The mischief which may be caused by a single garment that has been in contact with this highly contagious disease, even after the lapse of considerable time, is sometimes difficult for the inexperienced medical attendant to comprehend. The care and watchfulness necessary at our maritime quarantines to secure the public against the dissemination of this contagion is often illustrated in a marked degree. In the year 1880, the bark *Kings County* arrived from Amsterdam. One man had died on the passage, the fifth day of his sickness, and was buried at sea. The captain, who was his sole attendant, was only able to describe the disease as being characterized by "dark, bloody-

looking spots." Under the suspicion that it was a case of a hemorrhagic small-pox, the bark was detained at quarantine for observation, notwithstanding the captain's protest, and his earnestly expressed conviction that none of the crew could have been exposed to the disease. Remonstrance proving useless in securing the release of his vessel, he urged the necessity of going to the custom-house to enter his vessel. This he was permitted to do only after changing all clothing that had been worn while caring for the sick man, and wearing such clothing as had no suspicion of contact with the contagion. The third day of the detention of the bark, two of the crew were taken sick with small-pox, and the fourth day a third man became ill of the same disease. Had this vessel been suffered to proceed without detention, there is great probability that the master of the vessel would have scattered contagion far and wide, by contact with the crowd that every hour of business days frequent that busy mart, as he had conveyed it to the susceptible portion of his own crew; and they in turn would have signalized their return to friends far away, or to cities that environ the port, by spreading among them the contagion of this loathsome and fatal disease.

In the early part of the present year, the necessity of a repetition of the often repeated and published rules and regulations was apparent, owing to the neglect of some of the surgeons of steamships and the change and removal of others, and the substitution of inexperienced medical officers. The following circular was accordingly issued and put into the hands of every surgeon on transatlantic passenger steamers, through their agents or owners at this port.

CIRCULAR.

HEALTH OFFICER'S DEPARTMENT, STATE OF NEW YORK.

To Medical Officers of Transatlantic Passenger Steamship Lines entering the Port of New York:

To insure the better protection of the health of the people of the United States from the introduction of contagious and infectious diseases by immigrants arriving at this port, and for the benefit of the commercial interests affected by such quarantine restrictions as may be considered necessary to secure the first-named result, the following regulations are instituted and enjoined upon all officers and particularly surgeons of vessels carrying immigrant passengers:

1. The examination of all steerage passengers by the surgeon of the steamer within twenty-four hours after they embark, to ascertain if they are sufficiently protected from small-pox by vaccination, and the vaccination of all persons not sufficiently protected.

2. The re-examination of persons vaccinated by the ship's surgeon before entering port, and the re-vaccination of those whose vaccination has not been successful.

3. The distribution of vaccination cards to all persons protected sufficiently by previous vaccination, and by the successful vaccination of the surgeon of the steamship.

FORM OF CARD.

NAME OF STEAMSHIP.

DATE WHEN ISSUED.

VACCINATED.

Name of Surgeon,

On the reverse side must be printed in three or four of the principal European languages the following:

"Keep this card to avoid detention at quarantine and on railroads in the United States."

4. At least two hospitals should be supplied by every passenger steamship; one for contagious, and one for non-contagious diseases.

5. All persons with contagious disease should be isolated in hospitals, not opening into the steerage or crowded gang-ways frequented by passengers.

6. Communication with such hospitals, when occupied, must be strictly forbidden, and the attendant of the sick not permitted to come in contact with other persons.

7. Vaccine virus should be obtained from the most reliable sources, and kept until used in a temperature not above 55 deg. F. nor below freezing. A compartment in a refrigerator where the temperature is uniform is suggested as a proper place for this purpose. Many failures in the vaccinations made by ship's surgeons are noticed in consequence of imperfect virus.

8. All persons suspected of having contagious diseases, particularly small-pox and typhus fever, must be isolated on the appearance of the initial symptoms. Frequent visits to the steerage and close observation of passengers by the ship's surgeon is earnestly enjoined.

Persons having, or suspected of having, the above-named diseases should not be discharged from hospital until arrival at quarantine, that the responsibility of discharge or removal to hospital may be assumed by the Health Officer.

Attention to these regulations will save the passenger steamships time and expense at the New York quarantine.

WM. M. SMITH,

Health Officer, Port of New York.

The steamship *France* with seven hundred and twenty-one steerage arrived at quarantine June 7. Caroline Gossi, aged thirty-one, was taken sick June 3 with small-pox. She had been successfully vaccinated when a child, and was again vaccinated on the 29th of May by the ship's surgeon, but unsuccessfully.

July 1. One case of small-pox was removed from the steamship *DeRuyter* from Antwerp with two hundred and forty-two steerage passengers. The surgeon of the steamer had vaccinated all. Examination at quarantine showed that but ten of his vaccinations were

successful. All steerage passengers were again vaccinated, except those on whom the vaccinations by the surgeon were found successful.

The steamship *Geiser*, with seven hundred and twenty-eight steerage passengers from Copenhagen, arrived July 2, eighteen days from the port of departure. The surgeon reported one case of varioloid since leaving port that had recovered and had been discharged from hospital. That the case should have occurred and recovered between the 16th and the date of arrival, leaving not a trace on the patient, afforded ground for suspicion that the surgeon's diagnosis was not correct. But there was no means of proving or disproving it, and as the patient had mingled again with his fellow passengers, they were all again vaccinated except the few successful vaccinations made by the ship's surgeon, the hospital quarters were disinfected and *pratique* was given the vessel the same day.

July 22. The steamship *Halley* arrived from Santos June 21 and Rio Janeiro the 25th. Christina Pederson, a passenger, had small-pox. The eruption appeared July 17. The isolation of the case was not satisfactory. The case was removed to the small-pox hospital. The passengers and crew were vaccinated, and the passengers and patient were removed to Hoffman Island for observation until the completion of the period of incubation from the time of exposure.

August 10. The steamship *Columbia* arrived from Mediterranean ports with one hundred and two passengers, who embarked at Naples July 23. Six days before arrival a steerage passenger was observed to have a suspicious eruption. The case was immediately isolated. On arrival at quarantine the eruption had not reached the pustular stage, but was evidently abortive, in obedience to the influence of the *vaccinia* introduced by the surgeon of the *Columbia* a few days after leaving Naples. The case was removed to hospital, and passengers and vessel were treated as in other cases.

Believing that successful vaccination of those immigrants who were insufficiently protected, before leaving home, at the port of departure, or soon after embarking, would insure entire protection to the people of the United States from this contagion introduced by immigrants, the health officer has employed his most diligent efforts to secure this result. The distribution of circulars by the soliciting agents of the transatlantic passenger steamship companies, among intending passengers, warning them to be vaccinated before leaving in order "to avoid detention at the New York quarantine," and the unusual care exercised in the examination of the resorts of immigrants at the port of embarkation have contributed to secure far greater immunity from this disease among immigrants arriving at this port during recent years, and particularly the last six months. A persistent effort has been made during the year last past to induce surgeons of passenger steamers to examine the immigrants and vaccinate the insufficiently protected within twenty-four hours after they are received on board; feeling assured that if this was done the contagion of small-pox which they may have received en route to, or at the port of departure, within two or three days previous to vaccination, would be arrested in its development. The success in securing the examination and vaccination of immigrants within the first twenty-four hours after leaving port has not been commensurate with the effort made. The "sea sickness"

which very generally prostrates a great portion of the passengers soon after the voyage is commenced, continues several days, making it next to impossible for the surgeon in some cases to give the desired attention to this duty, and in others, and in many instances, affords a good excuse for neglecting it.

Table showing the ratio in 1,000 *of emigrant passengers vaccinated by the surgeons on the voyages of the respective steamship lines.*

Name of Steamship Line.	Ratio in 1000 passengers.
North German Lloyds	952
Hamburg American Packet Company	607
General Transatlantic Company	355
Inman Line	108
White Star Line	143
Guion Line	109
Anchor Line	508
National Line	80
Royal Mail	109
Thingvalla	66
State Line	71
Red Star Line	452
Seager Bros. { Beaver Line	50
Seager Bros. { Caar Line	50
Amsterdam Line	282
Cunard Line	270
White Cross	542
Monarch Line	74
Lyons & Co	120
Floris Line	30
Bordeaux Line	796
Great Western Line	487
C. L. Wright & Co	967

The following table exhibits the average time of examination and vaccination of immigrants by the surgeons of the principal lines, after leaving the port of departure:

	Days.
North German Lloyds	5
Hamburg American Packet Co	4 2-7 "
General Transatlantic Co	2 1-2 "
Inman Line	7 2-5 "
White Star Line	3 1-5 "
Guion Line	4 2-5 "
Red Star Line	3 3-5 "
Anchor Line	3 2-7 "
National Line	9 1-2 "
Royal Mail to the Netherlands	8 1-3 "
Thingvalla Line	16 "
Amsterdam Line	4 "
Seager Bros. { Beaver Line	8 1-2 Days.
Seager Bros. { Caar Line	4 "
State Line	7 "
Cunard Line	4 3-5 "
White Cross Line	3 "
Monarch Line	9 "
Lyons & Co	13 "
Bordeaux Line	2 "
Great Western Line	12 "
C. L. Wright & Co	8 3-5 "
Florio Line	.....

The results of vaccinations by ships' surgeons during the early part of the year were not satisfactory. In a large proportion of them no results were obtained. The *virus* when obtained was frequently defective; in many instances the *vaccina* was doubtless good when procured, but, being kept several days in the quarters of the surgeon before it was used, deteriorated, and often became wholly inert.

In every case of inefficient management on the part of the surgeon, or of unsatisfactory results from his vaccination, the consignees or owners of the steamer whose surgeon was derelict were notified of the fact; and at the first subsequent arrival of the vessel it was detained until every immigrant's arm was examined, and the evidence of satisfactory previous vaccination obtained, or vaccination was secured by the medical officers at quarantine.

The results obtained by the surgeons during the latter part of the past year are for the most part satisfactory. This work shows great improvement in every respect.

The percentage of successful results of vaccination on board the ships of the lines named during the month of December is given below:

North German Lloyds	26 1-2
Hamburg American Packet Co	03 1-2
General Transatlantic Co	10 4-5
Inman Line	91 1-2
White Star Line	88
Guion Line	86 1-10
Red Star Line	66 3-5
Anchor Line	75
National Line	91
Royal Mail to the Netherlands	40 4-5
Thingvalla Line	40
Florio Line	.....
Seager Bros. { Beaver Line	12 1-2
Seager Bros. { Caar Line	06 1-2
Amsterdam Line	41 3-5
Cunard Line	55 1-5
White Cross Line	37 1-5
Monarch Line	.....
Lyons & Co	.....
Bordeaux Line	.....
Great Western Line	35 4-5
C. L. Wright & Co	04 3-10
State Line	35 1-10

The English lines have much the largest ratio of successful results, but in justice to the other lines, particularly the German, it should be stated that the surgeons of the latter vaccinate a much larger proportion of their immigrant passengers than the surgeons of the former. The English surgeons as a rule have vaccinated only those who have no evidence of previous protection, or in whom it is very obscure. The German surgeons have vaccinated a large percentage of all steerage passengers, nearly four-fifths; the surgeons of the Bremen, or North German Lloyd Steamship Company, one of the two German lines, have vaccinated ninety-six-one-hundredths of all immigrant passengers transported by that line, while the English surgeons have vaccinated one-seventh of the aggregate number of immigrants on vessels from ports in the British Isles. The greater susceptibility of those who have never been vaccinated and who are almost exclusively selected by the English surgeons should be placed to the credit of the German surgeons who vaccinate many who are insusceptible to the *vaccinia*. The industry and fidelity of the German surgeons in discharging this duty have been conspicuous, notwithstanding the fact that the results have not been commensurate with their efforts, owing in considerable degree to the defective quality of the vaccine virus used. Surgeons of passenger steamers very generally regard the examination of immigrants as to their protection from small-pox, and the vaccination of the unprotected, as an unusual and burdensome duty. The tendency to discharge it with little regard for the desired result, or neglect it entirely, is much too frequent. A constant, systematic and careful investigation of their work is necessary to secure the performance of the duties imposed upon them by the "rules and regulations of the New York quarantine". The coöperation of the agents and owners of the principal lines has been for the most part cheerful and satisfactory. Surgeons who have been remiss in the discharge of a duty are notified of their neglect or failure through an open communication from the Health Officer addressed to the surgeon, in care of the manager or owner of the line. The following letters will illustrate this, and the several replies indicate the spirit in which the communication is generally received.

"HEALTH OFFICER'S DEPT., STATE OF NEW YORK,
QUARANTINE, S. I., *November* 23, 1882.

"*To the Surgeon of the Steamship* ——— :

"DEAR SIR — On your arrival at this port November, 1882, you certified to having vaccinated two hundred and fifty of the immigrant passengers. Examination of these at this quarantine discovered evidences of but eight having been vaccinated; two of this number successfully. There is occasion to believe that your work was not efficiently performed; and the late day of the vaccinations, the sixteenth, after leaving the port of departure, affords no evidence of protection against the contagion of small-pox which may have been received previous to embarkation.

"Earlier vaccination, and more careful discharge of that duty is respectfully urged.

(Signed) WM. M. SMITH,
Health Office, Port of New York."

REPLY.

"OFFICE OF THE HAMBURG AMERICAN PACKET CO.,
NEW YORK, *November* 24, 1882.

"Dr. WM. M. SMITH, *Health Officer, Quarantine, S. I.:*

"DEAR SIR — Acknowledging receipt of your esteemed lines of the 23d inst., we beg to inform you that we have had copies made of your letter addressed to the surgeon of the ————, which will be sent to all the surgeons of our lines, accompanied by renewed instructions to comply strictly with the recommendations made by you respecting the vaccination of immigrants. We are, dear sir, very respectfully yours truly,

(Signed) KUNHARDT & CO."

"HEALTH OFFICER'S DEPT., STATE OF NEW YORK,
QUARANTINE, S. I., *December* 5, 1882.

"Messrs. PETER WRIGHT AND SONS, *Agents of the Red Star Line:*

"GENTLEMEN — I desire to call the attention of the steamer ——, to the fact that the examination of the immigrant inspector at this quarantine discovers that but about one vaccination in sixteen was successful. It is believed that the vaccine virus was inert or nearly so, or that the work of the surgeon was very imperfectly done. Considering the results by surgeons of other steamers, the result is not commendable. Hoping you will be able to influence the surgeon of the ———— to more efficient work, I remain,

Very truly,

(Signed) WM. M. SMITH,
Health Officer, Port of New York.

REPLY.

OFFICE OF THE RED STAR LINE,
NEW YORK, *December* 7, 1882.

Dr. WM. M. SMITH, *Health Officer, Port of New York:*

DEAR SIR — Your favor of the 5th is received and noted. We will instruct our agents at Antwerp to investigate the cause of failure of the vaccinations by the surgeon of the steamship , and to adopt such measures as to prevent a recurrence of the same. Thanking you for your prompt notice, we are, Yours truly,

(Signed) PETER WRIGHT & SONS,
Per C. A. COOK.

HEALTH OFFICER'S DEPT., STATE OF NEW YORK,
QUARANTINE, S. I., *December* 4, 1882.

Messrs. PHELPS BROS. & Co., *Agents of the Steamship:*

GENTLEMEN — I desire to inform you that the omission of duty on the part of the surgeon of the in respect to the examination of her passengers as to their protection by vaccination from small-pox was

so marked as to deserve the censure of the quarantine authorities at this port. No examination or vaccination had been made by the surgeon or cards issued. On a previous voyage to this port he had issued cards certifying protection without any examination of the passengers, he is, therefore, entitled to small measure of credit for not issuing cards on this occasion. I regret to inform you that detention of passengers and vessel will be necessary in the future until the duty of the surgeon of the is faithfully discharged.

Respectfully yours,

(Signed) WM. M. SMITH,

Health Officer, Port of New York.

REPLY.

PHELPS BROS., AGENTS OF THE MEDITERRANEAN AND NEW YORK STEAMSHIP CO.,
NEW YORK, *December* 5, 1882.

WM. M. SMITH, M. D., *Quarantine, S. I.:*

DEAR SIR — Your favor of the 4th inst. ex. steamship, duly received, and contents have our careful attention. We have written fully to the company in regard to the matter, and feel sure it will be properly attended to henceforward.

Yours truly,

PHELPS BROS. & CO.,

Per S. VANHARTY.

HEALTH OFFICER'S DEPT. STATE OF NEW YORK,
QUARANTINE, S. I.

Manager General Transatlantic Co. :

DEAR SIR — On the recent voyage of the steamship to this port terminating November , the three hundred and fifty-six immigrants brought by her were examined by the immigrant inspector at this quarantine, although the surgeon certified to having vaccinated, twenty-five of this number not showing evidence of the surgeon's vaccination. One hundred and eighty had satisfactory evidence of previous vaccination. One hundred and seventy-one did not have such evidence ; these were vaccinated at quarantine. The vaccinations above referred to, or claimed by the surgeon to have been made, if made at all, were not made until the twelfth day after leaving port. It is respectfully suggested to the consignees and owners of this steamship, that early, and more efficient work by the surgeon will not only be for the interests of the company in securing the prompt discharge of vessels from quarantine, but will more successfully protect the lives and health of the people of the United States.

Very truly,

(Signed) WM. M. SMITH,

Health Officer, Port of New York.

The sanitation of passenger steamers has received much consideration from its intimate connection with the sea-mortality on board and the health of the people of the United States. The General Passenger Act of Congress, that became operative November 1, 1882, makes generous provisions for the safety and comfort of well immigrant passengers, but in the matter of hospitals is surprisingly defective in most material respects, namely, their location and isolation. Previous to this act, no mention of the hospital was ever made in any law of Congress regulating the passenger traffic ; there is, therefore, some means for congratulating immigrants, and in a greater degree the people of this country, that the sick on passenger steamers, if not the public, are considered deserving of some consideration. Further cause for such congratulation will hereafter appear.

From a report made to the British Parliament in the year 1849, it appears "that when the system of transportation was first adopted in some of the eastern voyages, full one-half of those embarked were lost."

The mortality on immigrant ships attracted the attention of the Senate of the United States in 1853, and the 7th of December of that year a select committee was appointed "to consider the causes and extent of the sickness and mortality prevailing on board the immigrant ships on the voyage to this country." The report of this committee show, that 36,950 passengers arrived at New York between September 1, 1853, and the first of the following January, and that the ratio of mortality during the passage was 52.3 per 1,000, while four hundred and fifty-seven sick were sent to hospital on arrival, many of whom doubtless contributed to increase this surprising mortality. The report of the Senate committee referred to, takes into consideration "the propriety of employing regular physicians and nurses and hospital attendants on board of passenger ships," but comes to the remarkable conclusion that "the committee are decidedly of the opinion that such an arrangement would be desirable ; but taking into view the uncertainty of the number of passengers that may be on board, and other circumstances, they cannot see how it can properly be made the subject of effective legislation." The Passenger Act of 1882 is in striking contrast with the conclusions of the Senate committee in 1853.

Washington, D. C., *August* 17, 1882.

The following act, which repeals and supersedes, on and after November 1, 1882, *existing laws relating to the transportation of immigrants, and which is to be cited for all purposes as the Passenger Act,* 1882, *is published for the information and guidance of officers of the customs and others concerned.*

An Act to regulate the carriage of passengers by sea.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled :

Section 1. That it shall not be lawful for the master of a steamship or other vessel whereon immigrant passengers, or passengers other than cabin passengers, have been taken at any port or place in a foreign country or dominion (ports and places in foreign territory contiguous to the United States excepted) to bring such vessel and passengers to

any port or place in the United States, unless the compartments, spaces and accommodations hereinafter mentioned have been provided, allotted, maintained and used for and by such passengers during the entire voyage; that is to say, in a steamship, the compartments or spaces, unobstructed by cargo, stores or goods, shall be of sufficient dimensions to allow for each and every passenger carried or brought therein one hundred cubic feet, if the compartment or space is located on the main deck or on the first deck next below the main deck of the vessel, and one hundred and twenty cubic feet for each passenger carried or brought therein if the compartment or space is located on the second deck below the main deck of the vessel; and it shall not be lawful to carry or bring passengers on any deck other than the decks above mentioned. And in sailing vessels such passengers shall be carried or brought only on the deck (not being an orlop deck) that is next below the main deck of the vessel, or in a poop or deck-house constructed on the main deck; and the compartment or space, unobstructed by cargo or goods, shall be of sufficient dimensions to allow one hundred and ten cubic feet to each and every passenger brought therein. And such passengers shall not be carried or brought in any between-decks, nor in any compartment, space, poop or deck-house, the height of which from deck to deck is less than six feet. In computing the number of such passengers carried or brought in any vessel, children under one year of age shall not be included, and two children between one and eight years of age shall be counted as one passenger; and any person brought in such vessel who shall have been, during the voyage, taken from any other vessel wrecked or in distress on the high seas, or have been picked up at sea from any boat, raft, or otherwise, shall not be included in such computation. The master of a vessel coming to a port or place in the United States in violation of either of the provisions of this section shall be guilty of a misdemeanor; and if the number of passengers other than cabin passengers carried or brought in the vessel, or in any compartment, space, poop or deck-house thereof, is greater than the number allowed to be carried or brought therein, respectively, as hereinbefore prescribed, the said master shall be fined fifty dollars for each and every passenger in excess of the proper number, and may also be imprisoned not exceeding six months.

§ 2. That in every such steamship or other vessel there shall be a sufficient number of berths for the proper accommodation, as hereinafter provided, of all such passengers. There shall not be on any deck nor in any compartment or space occupied by such passengers more than two tiers of berths. The berths shall be properly constructed, and be separated from each other by partitions, as berths are ordinarily separated, and each berth shall be at least two feet in width and six feet in length; and the interval between the floor or lower part of the lower tier of berths and the deck beneath them shall not be less than six inches, nor the interval between each tier of berths, and the interval between the uppermost tier and the deck above it, less than two feet six inches; and each berth shall be occupied by not more than one passenger over eight years of age; but double berths of twice the above-mentioned width may be provided, each double berth to be occupied by no more and by none other than

two women, or by one woman and two children under the age of eight years, or by husband and wife, or by a man and two of his own children under the age of eight years, or by two men personally acquainted with each other. All the male passengers upwards of fourteen years of age who do not occupy berths with their wives shall be berthed in the fore part of the vessel, in a compartment divided off from the space or spaces appropriated to the other passengers by a substantial and well-secured bulk-head; and unmarried female passengers shall be berthed in a compartment separated from the spaces occupied by other passengers by a substantial and well-constructed bulk-head, the opening or communication from which to an adjoining passenger space shall be so constructed that it can be closed and secured. Families, however, shall not be separated except with their consent. Each berth shall be numbered serially, on the outside berth-board, according to the number of passengers that may lawfully occupy the berth; and the berths occupied by such passengers shall not be removed or taken down until the expiration of twelve hours from the time of entry, unless previously inspected within a shorter period. For any violation of either of the provisions of this section, the master of the vessel shall be liable to a fine of five dollars for each passenger carried or brought on the vessel.

§ 3. That every such steamship or other vessel shall have adequate provision for affording light and air to the passenger decks, and to the compartments and spaces occupied by such passengers, and with adequate means and appliances for ventilating the said compartments and spaces. To compartments having sufficient space for fifty or more of such passengers, at least two ventilators, each not less than twelve inches in diameter, shall be provided, one of which ventilators shall be inserted in the forward part of the compartment, and the other in the after part thereof, and shall be so constructed as to ventilate the compartment; and additional ventilators shall be provided for each compartment in the proportion of two ventilators for each additional fifty of such passengers carried or brought in the compartment. All ventilators shall be carried at least six feet above the uppermost deck of the vessel, and shall be of the most approved form and construction. In any steamship the ventilating apparatus provided, or any method of ventilating adopted thereon, which has been approved by the proper emigration officers at the port or place from which such vessel was cleared, shall be deemed a compliance with the foregoing provisions; and in all vessels carrying or bringing such passengers there shall be properly constructed hatch-ways over the compartments or spaces occupied by such passengers, which hatch-way shall be properly covered with houses or booby hatches, and the combing or sills of which shall rise at least six inches above the deck; and there shall be proper companion-ways or ladders from each hatch-way leading to the compartments or spaces occupied by such passengers; and the said companion-ways or ladders shall be securely constructed, and be provided with hand-rails or strong rope, and, when weather will permit, such passengers shall have the use of each hatch-way situated over the compartments or spaces appropriated to their use; and every vessel carrying or bringing passengers shall have a proper located and constructed caboose and cooking-range, or other cooking-apparatus, the dimensions and capacity of which shall be sufficient to provide for properly cooking

and preparing the food of all such passengers. In every vessel carrying or bringing such passengers there shall be at least two water-closets or privies, and an additional water-closet or privy for every one hundred male passengers on board, for the exclusive use of such male passengers, and an additional water-closet or privy for every fifty female passengers on board, for the exclusive use of the female passengers and young children on board. The aforesaid water-closets and privies shall be properly inclosed and located on each side of the vessel, and shall be separated from passengers' spaces by substantial and properly-constructed partitions or bulkheads; and the water-closets and privies shall be kept and maintained in a serviceable and cleanly condition throughout the voyage. For any violation of either of the provisions of this section, or for any neglect to conform to the requirements thereof, the master of the vessel shall be liable to a penalty not exceeding two hundred and fifty dollars.

§ 4. An allowance of good, wholesome, and proper food, with a reasonable quantity of fresh provisions, which food shall be equal in value to one and one-half navy rations of the United States, and of fresh water, not less than four quarts per day, shall be furnished each of such passengers. Three meals shall be served daily, at regular and stated hours, of which hours sufficient notice shall be given. If any such passengers shall at any time during the voyage be put on short allowance for food and water, the master of the vessel shall pay to each passenger three dollars for each and every day the passenger may have been put on short allowance, except in case of accidents, where the captain is obliged to put the passengers on short allowance. Mothers with infants and young children shall be furnished the necessary quantity of wholesome milk or condensed milk for the sustenance of the latter. Tables and seats shall be provided for the use of passengers at regular meals. And for every willful violation of any of the provisions of this section the master of the vessel shall be deemed guilty of a misdemeanor and shall be fined not more than five hundred dollars, and be imprisoned for a term not exceeding six months. The enforcement of this penalty, however, shall not affect the civil responsibility of the master and owners of the vessel to such passengers as may have suffered from any negligence, breach of contract, or default of such master and owners.

§ 5. That in every such steamship or other vessel there shall be properly built and secured, or divided off from other spaces, two compartments or spaces to be used exclusively as hospitals for such passengers, one for men and the other for women. The hospitals shall be located in a space not below the deck next below the main deck of the vessel. The hospital spaces shall in no case be less than in the proportion of eighteen clear superficial feet for every fifty such passengers who are carried or brought on the vessel, and such hospitals shall be supplied with proper beds, bedding and utensils, and be kept so supplied throughout the voyage. And every steamship or other vessel carrying or bringing immigrant passengers, or passengers other than cabin passengers, exceeding fifty in number, shall carry a duly qualified and competent surgeon or medical practitioner, who shall be rated as such in the ship's articles, and who shall be provided with surgical instruments, medical comforts, and medicines proper and

necessary for diseases and accidents incident to sea-voyages, and for the proper medical treatment of such passengers during the voyage, and with such articles of food and nourishment as may be proper and necessary for preserving the health of infants and young children; and the services of such surgeon or medical practitioner shall be promptly given, in any case of sickness or disease, to any of the passengers, or to any infant or young child of any such passengers, who may need his services. For a violation of either of the provisions of this section the master of the vessel shall be liable to a penalty not exceeding two hundred and fifty dollars."

The death-rate on passenger steamers would doubtless be much greater at the present time than it is, if the conditions to which passengers are subjected on many of our ocean steamers, in the matter of defective ventilation, improper food, and crowded steerages were supplemented by the unavoidable conditions to which the same class of people are subjected on land. In other words, the pure air which prevails on the ocean, the vigorous condition of health with which the immigrant sets forth upon his long journey, the high hopes of prosperity in his anticipated new home, and the fact that nine-tenths of the immigrants to this country are superior in endurance to the population they leave behind, lead us to expect that mortality *in transitu* will be exceptionally small. The statistics which relate to the sickness and mortality among immigrants arriving at this port on the different lines during the six months ending December 31, 1882, are briefly expressed in the following table:

NAME OF STEAMSHIP LINE.	Total number of Emigrants.	Number of Deaths.	Ratio of deaths in one thous'd
North German Lloyd	30,540	46	1.50
Hamburg American Packet Co	28,834	28	.98
General Transatlantic Co	14,607	9	.61
Inman Line	12,069	11	.91
White Star Line	10,895	6	.55
Guion Line	10,544	7	.66
Red Star Line	10,115	12	1.18
Anchor Line	9,979	2	.20
National Line	9,779	12	1.23
Royal Mail Line	6,436	7	1.08
Thingvalla Line	6,038	6	.99
C. L. Wright & Co	343	.....	.....
Beaver Line } Seager Bros. }	179	.....	.....
Carr Line } Seager Bros. }	6,626	4	.60
Amsterdam Line	5,763	18	3.12
Cunard Line	4,228	5	1.15
White Cross Line	2,192	.....	.....
Monarch Line	1,335	.....	.....
Lyons & Co	1,263	2	1.58
Florio Line	631	1	1.58
Bordeaux Line	743	1	1.36
Great Western Line	620	.....	.....
State Line	4,397	9	2.04

In many respects the accommodations for the comfort and safety of immigrant passengers have been improved within the last three years. Many new steamers have been added to this portion of the world's merchant marine within that period, and with very few exceptions they have been materially improved, with a view to the comfort and safety of passengers.

In a communication published in the second volume of the Reports of the New York State Board of Health the writer endeavored to show that immigration is not only a feature of the social, political and economical problems of to-day, but will become an important condition in the solution of these problems for years to come. Boundless wealth in soil continental in area, exhaustless mineral wealth, untold millions in primitive forests, and the freedom which has no trace of the old world's tyrannies, invite to our shores the strong arms and willing hearts of European communities. An army greater than Napoleon led into Russia in 1812 has passed into the United States during the year past, not with banners and martial step, but in peaceful and unobtrusive procession, mingling and quickly merging with the pre-existing population, and contributing to the material prosperity of the whole country. More than one-fifth of the number which represents the present population of the United States have landed on our shores since the year 1820 as aliens, and have become a part of the bone and sinew of the people. If, then, present conditions are to continue; if prospects of prosperity and happiness in the new world are to invite the immigrant for an undetermined, but at least considerable time in the future, and his coming is to be greeted with the generous welcome hitherto extended, it is eminently proper that it should be associated with such sanitary conditions as will protect the lives and health of the people of the United States. The gateways of the great highway of nations are at our maritime ports. If these admit immigrants with latent or developed germs of contagious or infectious disease to our seaboard cities or inland populations, the strategic position, the vantage ground is lost in the contest with these subtle and malignant foes of the human race. A much greater effort will be required to pursue and destroy disease when its forces are recruited and multiplied in the crowds of cities, along the great thoroughfare of travel and among distant and widely separated interior communities. The quarantines at our ports of entry should be the location for faithful sentinels who warn the people of the approach, and protect them from the introduction of contagious and infectious diseases.

The detection and removal of developed cases of infectious or contagious diseases is a plain and important duty, but by no means the sole obligation of the quarantinist who guards the approaches to our seaboard and interior populations.

The hygiene of ships has hitherto received but a small measure of the consideration to which it is entitled. How to escape the perils of the sea has engaged so much of the attention of those who tempt them, and of those who build vessels for the transportation of passengers, that the sanitary condition of the vessel has been a secondary consideration. The *location of hospitals*, medical attendance and ventilation are the great essential deficiencies in the present construction and management of passenger steamships.

The passenger act, before referred to, affords protection to passengers against overcrowding, makes it obligatory to give them proper and sufficient food, air space, and in many respects promotes their comfort and safety.

The great number of immigrants now reaching our shores, in steamers crowded to their utmost capacity, the condition of many of these in respect to ventilation of steerages, and hospital arrangements, will convince the intelligent observer that an immense amount of latent contagion passes into the country and is spread far and wide among the population of our seaboard cities and populous interior communities. And this is true not only of the contagion of small-pox, but of those other contagions, viz.: Diphtheria and scarlatina, whose victims annually far out-number the victims of the disease first mentioned. By far the most dangerous to the public health, of the conditions referred to, is the improper location of the ship's hospital. In the year 1880, the hospitals of the transatlantic passenger steamers, with few exceptions, were located in rooms opening directly into the steerage, or gangway of the vessel. In a large majority of these steamers there was no ventilation except that which was afforded by the port lights and the door, and the former is not often allowed to be open for fear some of the ocean breezes will find access to the suffering sick. The door consequently affords the principal means for the admission of air to the hospital room, only to be inhaled by the immigrants in the steerage. The location of the hospital in the covered gangway, or waist of the ship is scarcely less objectionable; the germs of small-pox, typhus, scarlatina or diphtheria, that impregnate the atmosphere, are sown among the great number of people who frequent this portion of the ship, to germinate and reproduce the disease in crowded cities, along the great highways of travel, or in distant rural hamlets.

While municipal ordinances and State laws are invoked to secure an efficient quarantine, to prevent the propagation of these diseases, to the extent of forbidding public funerals of persons who die of infectious and contagious diseases, neither national nor State law provides for the isolation of hospitals for contagious diseases, or gives to the quarantine officer, who is expected to prevent the admission of such diseases into our ports, the power to compel such an arrangement of hospitals as will prevent the infection of the well.

The maritime quarantinist at the port of arrival is in a great measure powerless to prevent the introduction of those latent contagious and infectious diseases whose periods of incubation are as long as that of small-pox. To detain at quarantine passenger steamers until the incubative period of small-pox has expired, as is done with Havana steamers to prevent the introduction of yellow fever, would be to all intents and purposes an embargo on the passenger lines to this port.

The health authorities are, then, restricted to two principal means of prevention: first, in the case of small-pox, to early vaccination by ships' surgeons of all passengers insufficiently protected by it; and second, in the case of all contagious and infectious diseases that may develop *en route* to the port of destination, complete isolation of the sick from the well.

The importance of the latter can scarcely be estimated. A single

case of latent contagion borne into the interior has not unfrequently resulted in an endemic or epidemic in which the loss of many lives has been the penalty. The introduction of small-pox into our towns, villages and interior cities is not often the result of inefficient inspection of the health authorities at our maritime quarantines, for it is a disease that the experienced physician quickly detects, but it is frequently due to the latent contagion contracted by the immigrant before embarkation, or from the contagion of cases on board ship which are improperly isolated. Other contagious diseases than small-pox and typhus fever, such as scarlatina, diphtheria and measles, are not quarantinable under the laws of this State. The Health Officer of the port of New York, not having the power to remove these cases, or punish the violation of regulations for their proper isolation, no adequate quarantine measure to secure proper isolation of the sick, or disinfection of the clothing, baggage and quarters infected by those non-quarantinable diseases can be effected. Proportionally as the power of the quarantinist is defective in those respects, the necessity is increased for such other sanitary conditions as *can* be secured through the authority delegated to him.

The location of hospitals on passenger steamships, so as to secure complete isolation, is one of the most important of these. When quarantinable diseases are put in hospitals so located as to make it reasonably certain that contagion has been disseminated among the well passengers, the Health Officer has the power, and it is his duty, to detain the exposed persons for observation, causing thereby detention of the vessel, and expense to the agents and owners of the steamship in the maintenance of those under observation.

Coercive influence to this extent has in repeated instances been exercised by the Health Officer at New York. The result has been, that the hospitals of all the new transatlantic passenger steamships are located on the upper deck, with ventilation from the upper portion of the hospital; while in a great number of the older steamers provision has been made for contagious hospitals in isolated portions of the ship. This matter is of so much importance to the health not only of all those who "go down to the sea in ships," but to the communities with which they soon again mingle, and among which they distribute the developed contagions whose germs are widely scattered from the hospitals on the steamer, that a careful examination of every passenger steamer which enters the port of New York has been made, with reference to the location of its hospitals.

On the "White Star" line all hospitals are isolated.

The "Cunard" and "State" lines have each one hospital not isolated; "Monarch" line, one hospital not isolated; "Williams & Guion", three hospitals not isolated; "Inman," two hospitals not isolated; "National," five hospitals not isolated; "Hamburg American Packet Company," six hospitals not isolated; "General Transatlantic Company," four hospitals not isolated; "North German Lloyd," six hospitals not isolated; "Anchor," six hospitals not isolated.

These constitute the principal and most popular of the steamship lines. It is significant that the *most* popular have the least number of objectionally located hospitals. The German lines have each fifteen regular steamers.

The time is not distant, it is hoped, when those who cross the sea will not only inquire if the vessel on which they propose to embark is staunch and swift, but whether its hospitals are located so as to protect passengers from the contagion of whatever disease may be developed on board.

Statutory provisions will strengthen the hands of the quarantinist, and contribute to the protection of the public health, by making it a misdemeanor to put sick of contagious and infectious diseases on passenger steamers in hospitals which are not properly isolated.

It is within a comparatively recent period that the sanitary condition of passenger ships, provision for hospitals, and medical attendance for passengers have received any attention. The conclusions of the committee of the august body appointed thirty years ago to investigate the great mortality among passengers from European ports to this country, referred to on a preceding page, are scarcely less surprising than the omission in the law of 1882 to provide for the proper isolation of hospitals for contagious diseases, an improved system of ventilation for the steerage, and adequate medical attendance.

The ratio of mortality during the past year among the passengers to this port has not been excessive when compared with the average mortality among the populations of our cities; but, as before stated, it must be taken into consideration that the vigorous and hopeful portions of foreign populations come to our shores; that they leave behind them the unsanitary condition and malarial influence which generally surround crowded communities, for the healthful invigorating atmosphere of the ocean, and ought to furnish a very exceptionally low rate of mortality.

If, then, the average mortality among steamship passengers equals that among populations in the countries from which they come, we must believe that it is greater than necessary.

The *immediate* effects of the unsanitary conditions which arise from the causes alluded to are seen when specific agencies such as typhus, small-pox, scarlatina, diphtheria and even that milder form of human contagion which is known as measles, are introduced among the passengers in a crowded steerage, as the following instances will illustrate.

May 27, 1882, the steamship *Nemesis* from Amsterdam arrived with twelve hundred and four persons in the steerage. Nine deaths had occurred on the passage; eight of these were from measles, six cases of the same disease and one of scarlatina were in the hospitals, which opened into the steerage, and the steerage itself was crowded and exceedingly filthy. Several deaths were reported to have occurred from the same disease subsequent to the landing of the passengers in New York. It is not, however, the immediate causes existing in unsanitary conditions and exposed hospital accommodations for those sick of contagious diseases on passenger steamers, so much as the remote causes which are productive of unfortunate results. The contagion is sown under circumstances which may distribute it with equal certainty among the crowded populations of our cities and the remotest hamlets of the country; and it germinates under conditions calculated to give rise to the most malignant type. Instances are not infrequent, where the contagion of these diseases which under the laws of this State the Health Officer of the port of New York is not authorized to

remove from arriving vessels, has created much alarm from its fatality when developed in interior communities, as in a township in Niagara county during the past year.

The Atlantic ocean has come to be but a great ferry, whose waters between the shores of the old world and the port of New York alone are furrowed by one hundred and seventy-three regular passenger steamships.

The migration and transmigration of the populations of the old and new worlds over this vast highway is now an essential part of the prosperity and life of the people of both continents. Days are always consumed, and sometimes weeks in crossing the ocean, during which time, often one thousand to fifteen hundred human beings are compelled to breathe the crowd-poisoned air of the steerage, in which too frequently the germs of contagious diseases from imperfectly isolated hospitals are distributed.

Notwithstanding the effort for three years past to have the location of hospitals for contagious diseases so situated that a reasonable degree of isolation could be secured, the hospitals of a majority of the steamships are yet objectionably located.

The ventilation of passenger steamers has received some attention in the act whose provisions have been quoted. But no *system* has been prescribed; consequently with few exceptions the antiquated bell-ventilator is still in use. Whoever has once visited the steerage of a steamship on arrival at any of our ports, with such a congregated mass of humanity as is frequently found there, will require no argument to convince him, however ignorant he may be of sanitary matters, that the atmosphere is pernicious to the health of the occupants, and that the fortunate combination of ocean breezes, and rapid transit alone prevents a fearful mortality among the occupants of the steerage. Ablutions are rare indulgences with steerage passengers, and change of garments equally so; excretions of the skin saturate, and crowd-poisoned atmosphere impregnates wearing apparel and baggage, so that the disgusting smells of the steerage herald the approach of the immigrant and remain with him for days after he leaves the ship. The medical officers of steamships are really powerless to change this; the removal of the noxious gases, and the supply of sufficient fresh air by a judicious system of ventilation, would do more than any other one hygienic measure to preserve the health, and secure the happiness of passengers.

In the newest Atlantic steamers, upon which money has been spent without stint to make them models of marine architecture, of speed and ornamentation, the effective system of fan and tube ventilation is ignored. It is natural to suppose that where human life and health are concerned, sanitary mechanism would be employed to at least rival the progress which is merely conducive to material prosperity and comfort.

The steamship "*Lessing*," has adopted a system of ventilation by an "*aeropher*," that, it is believed, would be of great service in the displacement of the foul atmosphere from, and the introduction of fresh air into, the steerages of passenger steamships. The few that the writer has seen in operation were productive of excellent results. The mal-odorous atmosphere of the steerage was absent; the pure health-

ful air from the sea had taken its place. The *aeropher* in use on the Hamburg steamship "*Lessing*," it is claimed, removes one thousand cubic feet per minute. The diagram represents a maximum capacity for removing and introducing air of something more than fifteen hundred cubic feet per minute. This capacity depends of course on the diameter of the *aeropher* which varies from 400 to 800 = 10 to 20 inches.

The "Act to regulate the Carriage of Passengers by Sea" has undertaken to deal with the questions of over-crowding, food supply, separation of sexes, sleeping arrangements, ventilation and cleanliness, and has many commendable provisions, which are a long way in advance of regulations previously in force. But the ventilation required under the "act" must continue to be greatly inadequate to the necessities of passengers, under the old system of bell ventilators, when as frequently is the case the hatches are closed during rough or stormy weather.

Intimately associated with the hygiene of ships is the ability and character of the medical officer who has, or should have, the sole charge and responsibility of sanitary interests, of the lives and health of those on board.

The number of those who cross the ocean is rapidly increasing. The arrivals at the port of New York were 135,020 in 1879, and 455,844 in 1882. The responsibility of the ship's surgeon is increased proportionately to the number. It would be a source of much pleasure if it could be truthfully said that the standard of the medical service on ships had been raised to the ratio of the increased numbers who are dependent upon it. While it cannot be said to have retrograded, it has not advanced in any degree corresponding to the necessity for improvement or to the progress of the profession in other fields of labor. Several causes contribute to this result. Far be it from the desire of the writer that the few noble men and skillful physicians on the transatlantic passenger steamships should be denied the credit to which they are entitled. The inferiority of ships' surgeons, as a class, is owing to causes which the profession have hitherto been powerless to remove or correct.

The first of these causes is the meagre compensation given to ships' surgeons. In no case is it more than £10 per voyage, and more frequently less. On one of the steamers of a wealthy German line, the young surgeon of the ship was asked what pay he got. Hesitatingly he replied, "About one hundred and twenty marks" ($28.80). Apologetically he continued, "I come, you know, to see the country. I am going to Brazil a trip or two, and then I am going home to practice my profession." The ship of which that young man was surgeon had from 1,000 to 1,500 persons on board each arrival at New York, for several months in succession.

The first few days on board ship are days of suffering by a large majority of passengers, not unattended with serious results, in some instances, to the feeble and infirm. The experienced surgeon has usually sufficient to attend to with the sick during those early days of the voyage, without looking after the ventilation, cooking and cleanliness of the ship, which it is as much his duty to attend to as it would be of the surgeon of a regiment when "in the field." It is scarcely to be

expected that those who own or control steamships will advance the price of medical services on shipboard while they are besieged with applications from doctors at the rates that are paid. The ship's surgeon is overworked, and has been since the great immigration commenced in the year 1880.

Social, political and economic conditions exist, and are likely to exist for years to come, which will bring to our shores the surplus population of the old world.

In addition to the sanitary supervision and medical attendance demanded of the surgeon in years past, he is now required to examine all immigrant passengers with reference to their protection from small-pox by vaccination, and to vaccinate all who are insufficiently protected. This duty is the most taxing ever imposed on the ship's surgeon ; and there are now many who are conscientiously discharging this duty. One of the captains of a German steamer, on being complimented on the evidences of faithfulness of his surgeon, replied, "that man has lived in the steerage during the voyage." And all for one hundred and twenty marks, and the gratuities which the generosity of passengers might bestow. The compensation given the surgeons of passenger steamers is an invitation to the best talent to stay at home, and a bid for the inexperienced, incompetent and dissolute to seek the position. It is not long since one of the surgeons of an incoming steamer at the port of New York was so disabled by inebriety as to be incompetent to sign his name legibly to the usual affidavit, and when told by the Health Officer that if found again in the condition he was then, he would be likely to be quarantined, he was too stupid to understand the warning. The surgeon of one of the finest steamers that cross the Atlantic, and whose saloon list usually counts in the hundreds, on more than one occasion on arrival at the New York quarantine, has been too indisposed from the same cause to walk or talk naturally.

The German steamship "*Westphalia*" arrived at quarantine June 18, 1883, with eight hundred and forty-two passengers in the steerage; there had been three deaths at sea; one case of cholera morbus, then in the stage of collapse, had received no treatment, unless giving the patient some Rhine wine may be called treatment ; and one case of typhus fever, in the eighth or tenth day of development, that had not been discovered by the ship's surgeon until the morning of arrival. His diagnosis of the case was "prickly heat." Fortunately the quarters of the patient were in a state-room opening into the gang-way instead of in the steerage, and the prostration of the patient had contributed in a considerable degree to secure isolation.

If the pay of surgeons were reasonable, men of the class referred to would be quickly displaced by men of greater ability, more experience and with regular habits. The health authorities at the ports of arrival in this country, as also in the interior, are not only bound in the interest of suffering immigrants, but of the vast population with whom the immigrants will soon mingle, and among whom they may distribute infectious and contagious diseases, whose latent germs were sown during the voyage, from the inefficiency or incapability of the medical officers of steamships, to "cry aloud and spare not," until a more efficient system of medical marine service is secured. The uncertain

tenure of the office of surgeon of steamship is also a reason for this inefficiency of the service. His tenure of office should be as permanent as that of other officers, his rank as fixed, his responsibilities as defined, interference with his duties as unallowed as those of any officer of the ship. The medical service of the mercantile marine needs to be wholly reorganized, and a system adopted essentially different from that which exists.

A board composed of retired surgeons, or of medical gentlemen appointed by the board of trade, for English vessels, and for German and French vessels, by bodies of similar character, should constitute an examining board, whose duty it should be to inquire,with proper diligence, into the character, habits, and professional capacity of the candidate. The appointee of this board should be secure in his tenure of office except for cause, and as certain of his rank by seniority of appointment as other officers of the line. His duties should be specifically defined: the visitation of the steerage at least twice each day; inspection of food and its preparation ; inspection with reference to the general sanitary condition of the ship ; a record of the medical and surgical cases occurring on board during the voyage, and the treatment of the same, should be required to be made to the board of trade or to the medical board. Full authority in all matters pertaining to the sanitary condition of the vessel, the isolation of the sick, and their management, when it shall not interfere with the discipline of the ship, should be guaranteed to the medical officers. Surgeons having charge of more than five hundred passengers should have an intelligent medical assistant or steward, who is subject to, and whose sole duty it should be to assist the chief medical officer of the ship. If it was made the duty of such an assistant to see that all sick passengers who were able attended the "surgeon's call" at a designated hour of each day, and in the interval to exercise proper diligence in discovering those who became sick, and in dispensing the treatment ordered by the surgeon, there would be fewer cases of contagious disease to develop and scatter their germs among the occupants of the steerage, much more comfort and safety for the immigrant passengers, and infinite relief to the over-worked and ill-paid surgeon. The medical officer thus appointed should be required to report to the central authority at every "round trip" of the steamer of which he is the medical officer, as to the deaths, cases of sickness, their treatment, and the sanitary conditions of the vessel. These reports, if made by intelligent and faithful officers, would be valuable additions to the medical literature of the day. But to insure such reports as will expose improper interference with their authority or duties, and secure faithful reports of the diseases on ship-board, their causes, suggestions as to remedial measures, and of the sanitary conditions of the vessel in their charge, protection must be assured them in the discharge of this important and responsible duty, and in case of officious or vindictive interference or complaint, an impartial, disinterested board should be provided to which they can answer.

The abject submission to ignorant, capricious or ill-tempered masters of vessels, to which medical officers are frequently compelled, is subversive of important sanitary interests. This is well illustrated in the case of a steamer that arrived at the port of New York from Rio

Janeiro a few months ago. One case of small-pox had developed on the voyage, which was promptly isolated by the surgeon ; a few days subsequent to the isolation of this patient, two of the crew were taken sick with symptoms which seemed to the surgeon suspicious of small-pox. A day or two of observation served to convince the doctor that he was mistaken in his diagnosis of the last two cases isolated. This fact coming to the knowledge of the captain, the men were imperatively ordered to duty, notwithstanding the protests of the surgeon, without disinfection or change of their clothing. The consequence was that a portion of the crew believed to be susceptible of the disease was held in quarantine. The result justified the measure, as three cases of small-pox were soon developed. The effort made by the Health Officer to convince the captain, with the aid of the subsequent results, that though he might know more of navigation than the doctor, he knew less about small-pox, it is presumed was successful.

If the present system of remuneration of medical officers of the mercantile marine is to continue, few men of the desired intelligence, experience and ability will in the future, as in the past, be found in it. Even as a measure of economy it would be better for the principals of the transatlantic passenger lines to this country, to give their medical officers assurance of permanent employment at fairly remunerative wages, establish a system whereby promotion for faithful and intelligent services would be secured, and provision for retirement upon half pay, when age, ill-health, or misfortune, compelled them to withdraw from the service. In December, 1880, a steamship arrived at the New York quarantine with seven hundred and forty-nine steerage passengers. Two cases of small-pox were found among the steerage passengers. One of the cases was of the confluent type and had been allowed to remain in an open bunk, adjoining a space along which the other passengers passed without restriction. The other case was in the sixth day of the development of the eruption, and was not discovered until the Health Officer examined the passengers at quarantine. All the steerage passengers were removed to the quarantine of observation, and held at the expense of the consignees of the vessel until the results of the exposure were ascertained. May, 1881, eight hundred and nineteen steerage passengers were taken from one of the steamships from Glasgow by the Health Officer on arrival at quarantine, and kept under observation at Hoffman's Island several days, on account of six cases of small-pox discovered by him. The most seriously sick case was diagnosed by the ship's surgeon as chicken-pox, the other cases the ship's surgeon had not seen. The agents of these steamships truthfully declared, no doubt, that the detention of the passengers "wiped out all the margin." How many lives were imperiled by the neglect and ignorance of these medical officers was not a subject of inquiry, if it was of concern.

Respectfully submitted,

WM. M. SMITH, M. D.,

Chairman of Committee,

Health Officer of the Port of New York.

[F.]

REPORT OF THE STANDING COMMITTEE ON DRAINAGE, SEWERAGE AND TOPOGRAPHY

The duties assigned to this committee are amongst the most important that the local boards of health have to deal with. They often relate to more than one community or jurisdiction of a single local board, because the drainage questions, the extent of miasmatic grounds and epidemic areas not infrequently concern contiguous towns and adjacent counties. A large proportion of the subjects which the people bring to the attention of the Governor for his interposition through the State Board of Health are, under rules of the Board, referred to this committee.

Experience during the past two and a half years has shown that the people are becoming intelligently concerned about those sources of disease and danger which arise from miasmatic conditions and filthy outflowing, accused by health officers and physicians as the most preventable sources of sickness and untimely mortality.

In the Board's previous reports numerous instances have been briefly presented for the purpose of conveying a correct idea of the importance of these sources of danger to health and life. In the present report the committee begs leave to submit a series of consecutive statements, which correctly set forth what the State is now doing through this Board, and by the Governor's direction to aid in discovering, overcoming and preventing evils which, in most instances, communities that suffer them would not, without such aid and authority, successfully master.

Perhaps nothing will be more obvious to the reader, as certainly nothing is now better understood by this Board, than that the few laws in this State which relate to drainage, sewerage, water-supplies, and the protection of inhabitants in villages and cities, against the defilement of the ground, the atmosphere, and even of the drinking water, from filthy outflowings and other nuisances, are still vague and insufficient. It is believed that the statements here annexed relating to the chief questions which have been referred to the Board for its investigation and judgment will impressively illustrate the nature of all these sanitary problems in these respects, and also the importance of the drainage and sanitary protection of extensive areas of unhealthfulness in rural districts; for nothing, perhaps, could be more instructive than the experience of the Board and of the districts in which it has secured drainage, by aid of the State's interposition.

This committee again submits to the Board, that the conclusions of experience contained in a special report made by its chairman, a year ago, concerning the leading sanitary question connected with the sewerage of large villages and interior or small cities, as far as relates to the economy and sanitary advantages of the "separate system" of sewerage, should be maintained on principle by this Board. Civilization demands that the modern conveniences which place dwellings in cities and villages in a sanitarily safe relation to the public sewers shall,

under no possible circumstances, become changed to a perilous and pestilent connection with filth and foul air.

This committee has, during the past year, continued to advise the adoption of all known methods of such sanitary security, and chief among them is the separate daily "flushing" sewer system.

General Summary of the Investigations and Labors of the Committee on Drainage, Sewerage and Topography during the year.

During the past year, a large number of complaints relating to many different subjects have been investigated by the committee, and a brief account of the results of the more important cases is herewith appended.

The complaints and petitions for aid and counsel from local boards of health can generally be classified in some one of the following four principal divisions, viz.:

I. Nuisances caused by abandoned canals.

II. Obstructed natural and artificial water-courses.

III. Defiled natural and artificial water-courses.

IV. Sewerage and drainage of towns and villages.

From this general classification, it will be seen that the questions referred to the committee have a broad scope, and are often involved with a recognition of the defects of the laws of the State in regard to protecting properly the life and health of citizens in many cases where the local authorities are practically powerless to remedy existing evils from which a single community, or a continuous series of communities, suffer in a greater or lesser degree. The attention of the Board is therefore again called to the importance of securing such general legislation as will result in affording reasonably prompt relief from suffering in all cases where united action of the local authorities of adjacent districts becomes necessary. The mutual and reciprocal duties of individuals and corporations or communities, in regard to the conservation of the public health, should also be more sharply defined by law, so that a demand for the abatement of a public nuisance will receive due and speedy attention, instead of being associated with vexatious, and often intolerable delays. In illustration of this we may refer to the case of a village which may be in urgent need of sewerage, or some other necessary sanitary improvement, but which it cannot obtain for the reason that its articles of incorporation do not provide for the consideration or payment of such improvement; also to the case where the aggressor may chance to be a powerful corporation or association of certain interests, which by neglecting its plain duty toward one portion of the public, causes widespread suffering and annoyance over a relatively large extent of territory whose sanitary supervision may be vested in a number of independent local boards of health. Numerous other instances might further be cited in support of the general statement that the laws relating to the maintenance and due preservation of the public health should be carefully revised from time to time, and adapted to the results and necessities of

our modern civilization, and to the new industries and processes that are constantly being developed therefrom; but it will perhaps suffice to point out such needed alterations or modifications in the laws, whilst referring briefly to the series of special problems brought to our notice and submitted in the following statements in the order indicated above.

I. Abandoned Canal Nuisances and Miasmatic Disease in Livingston, Chemung, Schuyler, Monroe and Oneida Counties.

Extended reference to the nuisances resulting from the abandonment of the Genesee Valley canal in Livingston county, and of the Chemung canal in Schuyler and Chemung counties, has already been made in the second annual report of the Board; yet as the experience gained in the sanitary drainage of long stretches of abandoned canal is highly instructive, both in demonstrating the coördination of malarial disease with want of proper drainage, and also in exhibiting some of the legal difficulties encountered in the practical execution of drainage operations extending over considerable territory and under the jurisdiction of a number of independent local boards of health, this committee, therefore, submits the appended papers from the engineer employed to aid the committee in the discharge of its duties.

(*a.*) *Abandoned Genesee Valley canal drainage.* — In the case of the Genesee Valley canal, it may here be mentioned that its bank and prism came, by legally authorized sale, into the possession and ownership, for railroad purposes, of a corporation known as the Genesee Valley Canal Railroad Company; and that, in consequence of the neglect of said company to remove the stagnant water which had accumulated gradually in the canal prism, the section of said canal extending southerly from Scottsville, in the county of Monroe, to Kishaqua creek, or the Shaker community of Sonyea, a distance of twenty-nine miles, soon became miasmatic, and was duly pronounced a public nuisance. The local boards of health found themselves unable to obtain relief from the railroad company and finally appealed to the Governor, who, after a careful investigation and report by the Board, issued on November 1, 1881, the order printed on pages 295 and 296 of the second annual report, and by which said railroad company was required to drain the canal prism between the limits mentioned.

The condition of the canal prism at this time, together with a series of suggestions for effecting quickly and economically its drainage, will be found fully described in the following condensed report of the engineer, made on the 8th of August, 1881.

Report on the Condition of the Abandoned Genesee Valley Canal from Scottsville to Sonyea.

By E. Kuichling, C. E.

Rochester, *August* 8, 1881.

To the State Board of Health:

On the 14th ult. the undersigned received instructions from your Board to examine the condition of the abandoned Genesee Valley canal, from the village of Scottsville, in Monroe county, to the Shaker community of Sonyea, in Livingston county, and to ascertain the location and methods of abatement of certain nuisances arising from stagnant water in the bed of said canal.

The instructions received have reference to sanitary conditions essentially, and not to elaborate questions of engineering relating to the restoration of the original topographical characteristics of the country through which this portion of the abandoned canal was built, or, in other words, the object of these instructions was to obtain suggestions and plans, which should be simple, efficient and comparatively inexpensive, for permanently removing from the bed of said canal such stagnant and offensive waters as might be there found and thus improving the public health in that district.

In dealing with this question we have to notice that a corporation known as the "Genesee Valley Canal Railroad Company" is in possession of the main line of the abandoned canal from Rochester to Olean, by virtue of lawful purchase of the lands, easements and rights formerly vested in the State of New York. That portion of the canal, however, extending from the Shaker settlement of Sonyea to the village of Dansville, and known as the "Dansville Branch," is not included in the property of said company, but will revert in due time to the original owners of the land. Another element should also be considered, which arises from the sale of the structures upon the line of the canal to other parties. Owing to want of time and to the difficulty of obtaining accurately and definitely the desired information with reference to the necessities, designs and intentions of the various parties especially interested in the work of drainage, the undersigned asks leave to submit his views and methods for carrying out said work upon the assumption that neither the railway company, nor the landowners, nor the purchasers of the mechanical structures on the line of the canal, will by their operations materially alter the existing conditions. It is, therefore, assumed in the following that certain restrictions have been imposed upon the several parties aforesaid by terms of the sale and reversion, as otherwise an interminable series of complications might easily arise from the discharge of surface drainage through other channels than those which originally received it, and from the washing away of the embankments, etc.

The technical details, accordingly, of the general plans and methods of draining the canal herewith submitted may require revision and modification if the above-mentioned parties design to change materially

the present form and condition of the canal and its structures, particularly the locks and culverts, or if they should prefer, from private considerations, to undertake a more elaborate and expensive system of drainage at any point.

In the examination of the section of the abandoned canal described above, efforts were made to consult with the local health authorities in each township, and to learn to what extent the public health had been affected by the stagnant water. The complaints refer in particular only to a few localities, viz.: 1st, the stretch of canal from Piffardinia to Worcester's basin, a length of about two and one-fourth miles, in which water is retained by dams apparently for the purpose of watering cattle upon the Wadsworth farm; 2d, the portion of the canal from Lock No. 7 to Lock No. 8, in the town of Leicester; and 3d, the section from the eastern or southern corporation limit of Mt. Morris to the Shaker settlement. In all of these places the complaints seem to be well-founded, as the water upon the bed of the canal is stagnant and covered with algae, whereby it is rendered offensive to the sight, and at times also to the sense of smell. By the physicians, such localities are pronounced decidedly unhealthy and productive of malaria and fevers.

In order to present a comprehensive statement of the condition of the canal from Scottsville to Sonyea, the undersigned has prepared the following table, giving the distances between the various points and the relative lengths of the wet and dry sections on each level:

TABLE showing relative lengths of Genesee Valley Canal containing stagnant water between Scottsville and Sonyea.

SECTION.	Total Length. Miles.	Length containing water. Miles.	Length comparatively dry. Miles.	Remarks.
From Lock No. 3 to Lock No. 4...	8.64	7.40	1.24	Scottsville to Canawaugus.
From Lock No. 4 to Lock No. 5...	2.10	0.10	2.00	Canawaugus to Sackett's basin.
From Lock No. 5 to Lock No. 6...	5.10	3.00	2.10	Sackett's basin, south.
From Lock No. 6 to Lock No. 7..	8.16	3.16	5.00	Piffardinia and Cuylerville level.
From Lock No. 7 to Lock No. 8...	1.00	1.00	0.00	Genesee river, north.
From Mt. Morris to Sonyea..... ..	4.00	3.00	1.00	Genesee river to Kishaqua creek.
Totals.....	29.00	17.66	11.34	Miles.

The conclusions to be deduced from the foregoing table belong rather to physicians than to an engineer; and the undersigned will, therefore, restrict his statements to the general plan proposed for removing the stagnant water from the bed of the abandoned canal.

From Scottsville to Mt. Morris the canal is built on the western side of the valley of the Genesee river, winding generally around the hill-sides, and approaching quite often near to the river's shore. The same brief description will also suffice for the section from Mt. Morris to Sonyea. The towing-path of the canal is mostly an embankment formed from the excavation of the channel or prism in the slopes of the hills to the west and south; and hence many small lateral gullies or ravines on the hill-sides, having comparatively steep inclinations and limited drainage-areas, were received directly into the canal in order to save the expense of constructing culverts. Larger and deeper lateral

valleys tributary to the Genesee, on the other hand, are crossed by embankments of more or less magnitude, and the natural water-courses receiving the drainage of these valleys have been carried under the embankments through suitable culverts. The interception of the former, or small gullies and ravines by the canal, implies the reception during storms of considerable surface drainage water, which originally flowed down the hill-sides and across the lower lands, either into the river or into some more conveniently located tributary. By the construction of the towing-path embankment, many of these smaller water-courses in the lands below ceased to perform their functions, and have gradually become more or less obliterated by the combined action of the elements and the processes of agriculture; while on the opposite side of the canal, the drainage waters have, since the abandonment, continued to flow into the prism, thereby forming, in the original depressions, basins or pools which are frequently of considerable depth and extent. The drainage of these ponds or basins in the bottom of the canal becomes a vexatious matter where the original outlet has been wholly or partially obliterated, and its site is now occupied by cultivated ground, for complicated legal questions are liable to arise if an attempt were made, after the lapse of so many years since the construction of the canal, to trace out and restore the original outlet. Cases also occur where an originally large water-course of this kind has gradually been reduced to a small drainage ditch across the field or meadow; and if the concentrated drainage brought down from the ravine or gully during a severe storm were now to be discharged into such a ditch, an overflow, disastrous to any crop planted or growing in such a field, would probably ensue. In cases of this kind, where no other practicable solution of the difficulty can be devised, the undersigned would recommend that such a pond be allowed to discharge its present contents and future accumulations slowly through a contracted sluice or pipe.*

Before, however, undertaking a work of this nature, competent legal advice should first be obtained in order to define sharply what rights of drainage the railroad company possesses.

Fortunately the greater portion of the stagnant water in the canal can easily be removed by making use of the numerous culverts, aqueducts and spill-ways along its course, most of which are in close relation to existing natural water-courses of considerable size. Prior to the construction of the canal, these latter received in most cases the drainage that is now intercepted, and accordingly no valid objection to the return of such drainage into its original outlet can be raised.

The general plan herewith recommended by the undersigned for disposing effectually and economically of such water as collects in the canal under the present conditions, and becomes stagnant therein, may briefly be stated as follows, which is taken from the former report made on July 22, 1881, and reproduced here for convenience.

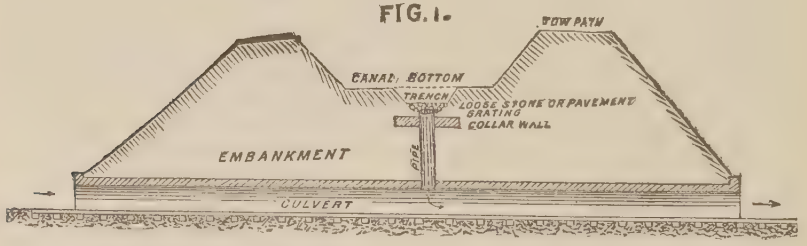
To thoroughly break up, by ploughing, a narrow strip of the thin and relatively impervious layer of accumulated silt, or clayey lining material originally deposited upon the canal bottom for rendering it water-tight; and then, by means of horse-scrapers, to remove the

*The details of this method will be found fully explained and illustrated on pages 289 and 290 of the second annual report of this Board.

loosened impervious material to the banks or sides, or to any convenient depressions or hollows in the prism. A shallow trench, about three (3) feet wide, can thus be formed rapidly in the bed of the canal and access obtained to the porous strata below, into which large quantities of water will readily pass by simple absorption. But to render the work of drainage still more effectual, these trenches should be cut with a slight, but uniform grade from a point or summit about midway between two consecutive places of discharge. For these places of discharge, natural water-courses of suitable magnitude should be chosen, which can always be reached by opening a culvert, or by lowering the abutments of aqueducts or the breast-walls and aprons of spill-ways. Where the distance between two such points is greater than desirable, or when the cost of trenching and grading would exceed that of a cut through the towing path bank into a ditch or old water-course of proper size, then the latter expedient should be adopted. It will thus be seen that by the general plan indicated in the foregoing, large volumes of storm water will be conveyed along the bottom of the canal into natural and open water-courses, while small quantities of rain or melted snow will be disposed of quickly by being absorbed into the permeable earth exposed by the trenches.

In opening a culvert, care must be taken to prevent the opening from becoming choked up by the earth and floating bodies which may be carried along by the current of water; and in case that the culvert is under a high embankment, as in Fig. 1, special attention must be paid to obviate a destructive washing away of the whole embankment

FIG. 1.

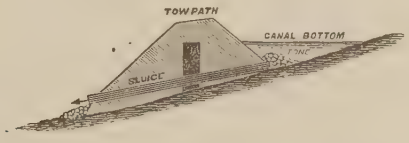


through the opening into the culvert. To reach such a culvert, the earth should be excavated vertically downward to the masonry, and an opening made through the latter. The culvert and the graded trench in the canal bottom are then to be connected by a strong closed channel or pipe, whose lower end rests upon the masonry and is joined watertight thereto by cement mortar, while its top is provided with a suitable grating and a collar wall of masonry. The excavated earth should be replaced around the pipe as compactly and tightly as possible by

pounding or puddling, in order to prevent the entrance of water in appreciable quantities into the body of the embankment; and to prevent scour on the bottom and sides of the trench, these surfaces should be paved with stone for a short distance in all directions. In all cases, moreover, the condition of the culvert and its foundations must first be thoroughly examined before it shall be subjected to the action of large volumes of water. Cast-iron pipe is the best material for this purpose, as it is not affected deleteriously by extreme changes of temperature, and is easily manipulated in such excavations. Its diameter should be proportioned in accordance with the amount of water to be discharged in a given period of time.

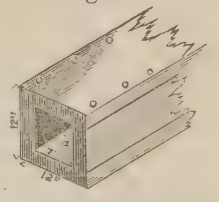
Similar precautions are necessary where the abutments of aqueducts or the breast walls of spill-ways and waste-weirs are to be lowered; and also where cuttings through the towing-path bank are unavoidable. When such a cutting is made for the drainage of a pond or pool formed by the construction of the towing-path bank across a gully or ravine, and when a suitable outlet therefor cannot be obtained without damage to the adjoining fields, but the only available outlet is a small drainage ditch or water-course which would be entirely inadequate to receive and discharge the drainage from the gully and the canal for some distance in each direction, then the undersigned would recommend the use of a tight pipe or sluice laid through the bank as indicated in Fig. 2, and the discharge

Fig 2.



of this sluice to be regulated by depositing a quantity of loose stone, or stone and brush, over and around its inlet at the foot of the bank. A cheap and excellent device for such a sluice or pipe is a rectangular tube formed of sound white oak plank well spiked together, the joints in the plank being properly broken or distributed. The plank to be two inches or two and a half inches thick, and of such width as to give an interior opening of from seven to eight inches square as shown in Fig. 3. A tube or pipe of this kind is quickly made and put into place; and when it has been well spiked together, it will be adapted to conveying water under pressure, besides being flexible enough to yield, without injury, to slight displacements by frost or settlement. Cast or wrought iron pipes, properly jointed, however, would be better; but the wooden box is, in the opinion of the undersigned, preferable to any kind of draining tile for such purposes. The earth excavated for such a cutting through the towing-path bank, must necessarily be replaced and compacted in the best manner, as the pond is liable to fill up during a heavy rain, thus subjecting the embankment to severe strains and the danger of being washed away. On the other hand, where a suitable water-course is available, pools of the kind referred to above may be drained directly by an open cut through

Fig. 3.



the bank. Having thus indicated in general terms the methods and precautions necessary for the drainage of the section of the canal under consideration, the undersigned will now submit a short statement relative to the condition of the abandoned canal from Scottsville to Sonyea.

At Scottsville, on the southern side of Allen's creek, the canal is in embankment, the material for which appears to have been derived from the adjacent low ground. This latter is now marshy and subject to overflow from the creek during high floods; but in ordinary seasons it may be drained by suitable ditches cut through the swamp into Allen's creek. The most effective remedy, however, would be to refill the excavated area to its original level.

About one and one-fourth miles south of Scottsville, stagnant water in appreciable quantity begins to be found upon the canal's bed, and continues thence without interruption to the foot of Lock No. 4, a distance of seven and four-tenths miles. This water is due to a number of rivulets intercepted by the canal, and its level is maintained by escaping through a spill-way and a cut through the berme bank.

From Lock No. 4 to Lock No. 5, a distance of about two and one-tenth miles, the canal bottom is marshy only in a few places, generally where an embankment has slightly settled and left the bottom lower than in places where excavations were made.

Following this is the level including the villages of Piffardinia and Cuylerville. The canal is quite dry from Lock No. 5 to a point about one-third mile south of Piffardinia, where a dam has been built across the bottom to retain the water. From this dam to Worcester's basin, near Cuylerville, stagnant water, varying in depth from one to one and one-half feet, is found continuously for the entire distance of two and one-fourth miles. Worcester's basin is a large pond, formed by the construction of the towing path bank across a gully, and has a water surface of about one and one-fourth acres, with considerable depth. The water in this section is mainly storm drainage, supplemented by the comparatively small quantity delivered by means of a wind-mill from the river through a wrought-iron pipe, several hundred feet long, and one and one-half inches in diameter. The adjacent lands are owned by Messrs. Chas. F. Wadsworth, R. M. Osburn, Martin Hayes, Isaac Budlong, and Mrs. Craig Wadsworth. Of this portion of the canal, particular complaint has been made by residents of Piffardinia on the north, and by Anthony M. Worcester on the south. An attempt is made to maintain a current in the water; but owing to the small influx, this can not be termed successful. From Worcester's basin southerly through Cuylerville to Little Beard's creek, the canal bottom is comparatively dry; while the portion from said creek to Lock No. 6 is quite wet, caused by the diversion of Samp's creek, above said lock, into the lower level. The entire length of this level is about five and one-tenth miles, of which three miles contain water.

The following level is short, and has water upon the bottom for the entire distance. Cases of ague are reported in the family occupying the lock-tender's dwelling.

At a short distance beyond, the canal enters the Genesee river, whose waters are kept out by a strong dam across the canal prism.

On the east side of the river, in the corporation limits of the village

of Mt. Morris, the local health authorities have already taken effective measures to remove the water from the abandoned canal; but from the south-eastern boundary of said village onward, water is found in the bed of the canal almost continuously to Kishaqua creek, a distance of nearly four miles. At Sonyea, a short distance north-west of this creek, a portion of the drainage from the Shakers' community is received into the canal.

As has already been stated, the drainage of this part of the abandoned canal described above can readily be accomplished, and without very great expense, provided that in this undertaking no heed be paid to the necessities or intentions of the railway company and the purchasers of the mechanical structures along the line. Proceeding upon this assumption, the undersigned will now submit a list of the items of work which he considers advisable to perform, between Scottsville and Sonyea, exclusively for the purpose of draining the bed of the canal and the pools or ponds found therein. Some of these items may perhaps be modified or omitted entirely from the list, after more careful deliberation and study of the different localities; while others, again, will undergo alteration at the hands of the engineers of the railway company, with whose necessities the undersigned has had no opportunity to become acquainted. In order, however, to secure attention to the subject from the several parties vitally interested, the following list is herewith submitted. * * *

Respectfully submitted,

EMIL KUICHLING,
Civil Engineer.

The order of the Governor requiring the Genesee Valley Canal Railroad Company to properly drain the abandoned prism was duly served upon the president of said corporation, and the subject was promised prompt attention; but considerable difficulty was experienced in obtaining from the railroad officials a substantial compliance with the terms of the order on account of the actual occurrence of some of the legal obstacles foreshadowed in the report of the engineer submitted above. Several examinations of the line of canal were made during the present and past year, and but little progress in the work of permanent sanitary drainage could be reported; yet by persistent efforts on the part of both the Town and State Boards of Health, the officers of the company were at length induced to continue the drainage operations which had been somewhat retarded by lawsuits, and late in the autumn the greater part of the work contemplated by the Governor's order was reported to have been accomplished, as will be seen from the following letter of Mr. Robert Bell, chief engineer of the railroad company, to Col. Ensign Bennett, general manager:

Genesee Valley Canal Railroad Company,
Chief Engineer's Office,
Mount Morris, N. Y., *October* 6, 1882.

Col. Ensign Bennett, *General Manager :*

Dear Sir — In accordance with your request, herewith I give a statement of progress made in draining the abandoned Genesee Valley canal.

Between Scottsville and Mt. Morris, cuts have been made through the tow-path and berme banks at points wherever sufficient fall could be had, and all stagnant water has been drained. There remain a few places which will have to be filled with earth, as sufficient fall for drainage purposes is not obtainable.

At Mt. Morris we have filled up some holes of stagnant water with fresh sand, thus doing away with the nuisance. After the completion of our switch track we shall put in a sluiceway to carry the town sewerage directly across our tracks instead of running it down to the old prism.

At the brewery we have put in a wooden flume in order to maintain a ditch, and a force is now engaged in digging a ditch to carry the brewery drainage to Buck Run.

Between the brewery and Sonyea, all stagnant water has been thoroughly drained by pipes through the tow-path.

At Tuscarora and above, a force is now engaged in ditching and making openings ; and such points as were designated as needing drainage will be well drained within a few days.

(Signed) Very truly,
R. BELL, *Chief Engineer.*

The inspections of the drainage works were made prior to the date of Mr. Bell's letter, and while many of the operations were still in early stages of progress, and since that time the Board's attention was called to other nuisances which demanded immediate notice.

With regard to the improvement in the general health of the territory adjoining the line of the former canal, and which had previously been quite seriously affected by the presence of large areas of stagnant water, it may incidentally be remarked that the most favorable reports were made to this Board at different times during the year by town officers and residents of all localities wherever drainage works were executed.

(*b.*) *Dansville Branch of Genesee Valley Canal drainage.*— On the Dansville branch of the abandoned Genesee Valley canal, which extends about twelve miles south-easterly from Kishaqua creek, or Sonyea, to Dansville, in Livingston county, and which was not included in the purchase of the railroad company, considerable work in the matter of sanitary drainage has also been performed during the past season by the Superintendent of Public Works in completing the operations commenced in July, 1881, and referred to on pages 285–293 of the

second annual report. An account of the condition of the prism last spring, as well as of the work then remaining to be performed by the State authorities, will be found in the following report of the engineer employed by the Board;

ROCHESTER, N. Y., *June* 3, 1882.

To the Chairman of Committee on Drainage, Sewerage and Topography, New York State Board of Health:

DEAR SIR — In accordance with instructions received a few days ago from your Board to examine the drainage works executed last summer upon the line of the "Dansville Branch" of the abandoned Genesee Valley canal, and to report what further work remains to be performed thereon in order to complete its sanitary drainage, the undersigned begs leave to state that on Wednesday, May 31, he carefully examined the condition of this section of said canal, from Sonyea to Dansville, in company with Mr. Thomas Evershed, division engineer of the western division of the New York State canals, and Dr. L. J. Ames, of Mt. Morris, N. Y., and would now respectfully submit herewith the following report:

The "Dansville Branch" of the abandoned Genesee Valley canal begins a short distance easterly of Kishaqua creek at the Shaker community of Sonyea, and winds for the greater portion of its length along the foot of the hill-sides in a south-easterly direction to the village of Dansville, in Livingston county. As the canal intercepts most of the surface drainage from the hills, provision for suitably disposing of the water conveyed directly into the prism of the canal through many small brooks, rills and gullies, became necessary upon its abandonment in order to prevent this water not only from becoming stagnant and thus a source of malaria, but also from escaping at points where it might cause much damage when delivered in large quantity. The State accordingly undertook the matter of draining the abandoned channel and caused considerable work in this direction to be performed last summer in accordance with certain general specifications submitted by me to your Board. The whole of the work contemplated would then have been completed, but for the refusal of a few individuals owning adjacent lowlands to permit the passage through or over such lands of any surface drainage which did not originally flow across them prior to the construction of the canal, and consequently the drainage of these sections has been deferred.

It should be remarked that in the comparatively level flats the original channels of many of the smaller natural water-courses now intercepted by the canal were either originally very indefinite or else were soon totally obliterated by the processes of agriculture, so that the course formerly taken by the drainage water at these places is now practically only a matter of tradition, and hence also of dispute, especially where different individuals own the land on opposite sides of the canal. To accomplish the drainage in a just and satisfactory manner, without giving rise to injunctions or other legal difficulties instituted by adjacent land-owners who may deem themselves aggrieved if any work is performed without their full consent, will therefore require the expenditure of considerable time on the part of

some agent of the State, particularly since several of these land-owners reside in other parts of the country. All of the owners, however, whom we could find and interrogate manifested a strong disposition to facilitate the work of drainage by conceding voluntarily the privilege of discharging limited quantities of water into such ditches as are now in existence across their lands where no well-defined original water-courses can be discovered, and in these cases it might perhaps be prudent to cause proper agreements to be duly executed and recorded in order to avoid future litigation.

In the general plan for the drainage of the canal, submitted last year, it was recommended that all culverts be opened and the breast-walls of all waste-weirs, locks and aqueducts lowered, after which ditches were to be cut in the bottom of the canal and suitably graded from intermediate summits to the points of discharge thus obtained. All of these structures, however, were sold last year by the canal authorities, mainly to parties interested in several lines of railway in process of construction through this region, and who purchased the said structures for the sake of obtaining the stone of which they had been built. Soon after the drainage of the canal was suspended, the work of removing the masonry was commenced and energetically prosecuted, so that now, with merely a few insignificant exceptions, only a series of excavations of more or less magnitude remain to indicate the places where culverts, aqueducts, waste-weirs, locks and bridges had formerly stood.

The tearing out and removal of this stone-work caused considerable injury to the new drainage ditches which had just been excavated in the canal bottom as in a number of places they are either obstructed by masses of waste material or else partially obliterated by the action of the wagons and horses employed to transport the stones along the canal to some convenient place for reaching the highway. In other localities bars of silt have been washed into the bottom from the numerous intercepted gullies and brooks; and small earthen dams are furthermore to be seen at frequent intervals which adjacent land-owners have built for the purpose of retaining water for cattle or for cutting ice. These dams have, in some instances, caused the storm-water collected by the canal from the hill-sides to flow in a direction opposite to that which had been planned in laying out the ditches; and as each land-owner appears to have acted upon the principle of self-preservation, other dams were speedily constructed, thus leading to the formation of a series of shallow pools in the canal bottom, which will become dry only by the slow processes of evaporation and absorption.

But in spite of these obstructions to the drainage ditches, much good has obviously been accomplished by the work done last year, since on the date of our inspection, two or three days after a rain-storm of unusual severity and duration, the canal bottom was comparatively dry over an aggregate length of about eight miles, which had formerly retained in midsummer a depth of from one to two feet of foul, stagnant water. The principal work yet to be performed in order to complete the sanitary drainage of the abandoned canal is upon the section from the hamlet of Keyserville easterly to Rock Spring creek, a distance of about two miles. In this section a large number of small brooks, rivulets and

gullies are intercepted by the canal, but no original water-courses of proper magnitude to receive large volumes of storm-water are to be found traversing the low ground adjacent. As the latter is drained only by a series of ordinary ditches, it is obvious that until the land-owners unite in the construction of a suitable channel or channels for the quick removal of the storm drainage from the hill-sides, the canal excavation should be retained in this locality as a storage reservoir, from which the water accumulating during a storm may be drained away slowly into the land ditches already mentioned by means of suitable appliances. The remainder of the work is extremely simple in character and will be found described with sufficient minuteness in the following pages.

Having thus referred in general terms to the circumstances attending the drainage of the canal, I will now proceed with a detailed description of its present condition from Sonyea to Dansville, indicating at each point what work should, in my opinion, yet be done.

1. From Kishaqua creek easterly through a portion of the lands owned by the Shaker community and also through the lands owned by Mrs. Geo. H. Starr, the canal bottom was ditched last year, but has since become partially filled in by silt. A small dam has also been built by the Shakers close to Kishaqua creek, whereby the flow of the water in the ditch is obstructed, and in time of freshets, it is reported that much water is thereby made to flow easterly instead of toward its natural outfall into said creek, thus causing a grievance to the adjoining owners. This dam should be removed and the ditch deepened from the creek to the second gully easterly, so as to throw the drainage westerly into Kishaqua creek.

2. Upon the farm of Mrs. Geo. H. Starr, a wooden culvert over a small water-course was opened, but as the timber of which said culvert was constructed is badly decayed and the water-way of the culvert considerably clogged, I would recommend that it be wholly or partially removed, and that the drainage ditches in the canal bottom be graded somewhat deeper on each side thereof to adjacent summits. At the barnyard on this farm the ditch has been obliterated by cattle and a small dam constructed to retain the water. The improvement of the drainage here should properly be performed by the owner.

3. Close to the line between the lands of Mrs. Starr and Frank Fitzhugh of Bay City, Mich., there is another old wooden culvert which was opened last year, but has since been closed up by Mr. Geo. W. Moore, lessee of the Fitzhugh farm, on the ground that more than a just amount of drainage was discharged from the west into this culvert and that the water seriously damaged certain lowlands leased by him. He expresses his willingness, however, to reopen this culvert as soon as he is assured that his neighbors to the west will not send their drainage down upon his lands. As some water was standing in the ditches cut into the canal bottom on both sides of the culvert, I cannot determine definitely whether they will require further grading. The work necessary here should be done by Mr. Moore. A number of ponds formed by the interception of ravines or deep gullies on the Fitzhugh farm were drained last year by means of wooden sluices or pipes, as recommended. The sluices have answered their purpose admirably and to the full satisfaction of this farmer. There

are, however, two other contiguous pools on this farm near a deserted log-house which should be connected by a ditch and the deeper one drained by a similar sluice through the towing-path embankment into an original water-course and land ditch near by. The canal bottom, for the greater part of its extent through this farm, is quite dry and has been planted with grain.

4. The latter remarks apply also to the following section of the canal through the lands of Joseph Cone and up to the large stone culvert over White's creek. A short distance easterly from this culvert, an open cut has been made through the towing-path bank to avoid opening the culvert; but as this cut is not quite deep enough to afford satisfactory drainage some little work will here be required. Beyond this point a ravine of considerable size is intercepted, and a small dam has been built across the canal bottom by Mr. Cone for the purpose of making a shallow ice-pond, which is to be removed. Still farther east, the excavation caused by the removal of a waste-weir has been entirely refilled with earth in order to avoid bridging the road-way formed by the towing-path. The outlet for intercepted storm-waters should be restored at once, or else be provided with a large sluice or drain-pipe. From White's creek to the eastern boundary of Mr. Cone's land, the canal bottom is somewhat wet in places, but can be rendered dry as indicated above, without much expense. A little ditching from the outlets mentioned in each direction will be required.

5. The adjoining farm on the east belongs to the Fitzhugh estate, and the canal bottom has here been made dry by the drainage of several ponds formed by intercepted gullies. Near the eastern boundary of this farm, a solid embankment for a farm road has been built across the canal, so that the ditch made last year, for conveying the water easterly into a large creek a short distance beyond, has been obstructed, thereby causing a small amount of water to become stagnant on the western side. The culvert over said creek has now been wholly removed, and a large quantity of excavated earth thrown across the canal bottom on each side, thus preventing the escape of any water. These dams should be cut away and the ditches in the bottom somewhat deepened.

6. The next farm is owned by Hon. James Wadsworth, of Geneseo. Draining ditches were here also excavated last year, rendering the canal quite dry, but in consequence of the construction of two small dams about four hundred feet apart, just west of the hamlet of Keyserville, a shallow pool has been formed for the purpose of watering cattle. Several springs, however, are received into the canal between these two dams, so that a slight current is created in the water, the surplus of which flows over the eastern obstruction and escapes through the ditch into a natural water-course close by through the opening caused by the removal of a waste-weir. Somewhat farther east, and just beyond the school-house of Keyserville, a ravine or gully empties into the canal, discharging its flood-waters westerly through the ditch into the canal bottom to the outlet already mentioned.

7. At a short distance east of this gully a dam has been built across the canal on the lands of Mr. Wadsworth, by which any further flow of storm drainage westerly is prevented, and as no culverts or suitable natural water-courses are encountered in the succeeding two miles, the

drainage of this section of the canal will require careful study. The adjacent flats are here owned in succession by Hon. James Wadsworth, Ebenezer McMaster, Stephen Kemp, Edward Jones and Richard McMaster, and are drained only by a series of land ditches wholly unsuitable for the reception of large volumes of storm-water without causing an overflow upon the fields. Several gullies and brooks are intercepted in this section, each bringing down large quantities of silt with every freshet, so that continuous ditching would here be of little avail. There is, however, a ditch, excavated formerly by the canal authorities for the purpose of intercepting any leakage from the canal, which extends along this entire distance of two miles from Keyserville to Rock Spring creek, and which is located at the foot of the slope of the towing-path embankment. From this State ditch, other ditches for carrying away the water and for draining the flats have been built at certain intervals; and into this system of ditches I would recommend that the drainage of this portion of the canal be conducted through a series of wooden sluices or pipes, to be laid under the towing-path bank and having their upper ends a short distance below the level of the canal bottom and then surrounded by a mass of small loose stones. In this manner the sluices or pipes will not become choked, while the quantity of water discharged by them can readily be regulated. One such drainage sluice should be laid at some convenient point between two consecutive gullies; and a ditch should be cut in the bottom, wherever required, from the sluice in each direction toward the summits or bars washed into the canal from the ravines. The exact points for the insertion of these sluices cannot well be described here, as before they are laid it may be necessary to obtain the consent of the owner of the contiguous land. It should be remarked that upon this portion of the canal no attempt at drainage appears to have been made on account of opposition on the part of the land-owners, and that the water is stagnant therein throughout its whole extent.

8. Near Rock Spring creek, the water is retained by a farm road-way across the canal without any suitable sluice underneath. The owner of the land at this place, Mr. Richard McMaster, objects to receiving into this creek, which flows into certain drainage ditches upon his farm, the storm-waters intercepted by the canal for a distance of two miles westerly, but is willing to have the sluices mentioned above inserted along his farm, provided that the remaining owners will do likewise.

9. The aqueduct on Rock Spring creek has been entirely removed and easterly of this creek ditches have been cut in the canal bottom for drainage purposes, but they require now a little deepening and better grading.

10. An aqueduct over Hartman's creek has also been removed and ditches have been cut in the bottom on each side; they should be made somewhat deeper in order to render the canal prism thoroughly dry.

11. Through the lands of Leonard Fields, the canal is well drained as far as a culvert near the eastern boundary of his farm. The stream passing through this culvert is a small brook which disperses its waters over the adjoining flats, and Mr. Fields objects to having it opened to receive the drainage from the next farm east, which belongs

to Dr. Faulkner, of Dansville. Along this farm and a portion of the adjacent one owned by David McNair, no opportunity for drainage presents itself, even with a sluice through the towing-path bank, unless a ditch is opened through the flats into some water-course to the north. I would, therefore, recommend that Messrs. Faulkner and McNair be required to open such a ditch for the reception of the canal drainage opposite to their respective premises, and that a wooden sluice be then laid under the towing-path bank to conduct the water into the same.

12. Just east of David McNair's residence a brook is intercepted by the canal which has deposited a considerable amount of silt and filled up the drainage ditch in the bottom so as to make the canal bed quite wet for some distance west. To the east the ditch is filled with running water from the brook, and empties farther on into a natural water-course through an opening in the towing-path bank made by the removal of a waste-weir.

13. Between this latter point and Bradner's creek the canal drainage is well executed and requires no further attention. At the creek, however, on the western side, a dam should be built across the canal prism in order to keep high floods in the creek from entering the canal excavation and flowing westerly through it to openings for drainage through the towing-path bank.

14. From the first to the third lock the canal bed is quite dry, but from Canaseraga creek to the fourth lock, the drainage ditch in the canal bottom should be somewhat deepened, and the scour-pool at the foot of said lock should be filled in with earth, which may be plowed and scraped in from the sides at slight expense. Similar pools exist at the foot of the remaining four locks, which should be filled in like manner. Between the fifth and sixth locks, also, the ditch in the canal bottom should be properly graded, as the water therein is now almost stagnant.

15. In the village of Dansville the canal prism is in a dry condition, but the excavations called the "Dansville Slip and Basin" require some attention. I understand, however, that these excavations are not considered parts of the canal, but are owned by private individuals, so that they will come directly under the notice of the local board of health, and will, therefore, require no further notice here, except the general statement that the ditch now cut in the bottom of the "slip" should be better graded so as to carry away the water more rapidly, and that the basin should not be made a receptacle for refuse organic matter.

If the work herewith specified is carried into execution, the drainage of the abandoned canal will be completed without large expense. Measures, however, should be taken to prevent the obstruction of the ditches by dams, or the plugging up of openings into culverts or other water-courses by the owners of the adjacent lands, as otherwise the malarial conditions, which this plan of drainage is designed to abate, will soon again return in the locality.

Respectfully submitted,

EMIL KUICHLING,
Civil Engineer.

The details mentioned in the foregoing paper were carried into full effect during the spring and early summer months of last year, but subject to certain restrictions imposed by the Superintendent of Public Works in conformity with the intent of the act of Legislature authorizing the work. By judicious management, however, and the general coöperation of the land-owners directly concerned in the sanitary improvement, the principal difficulties regarding outfalls were ultimately surmounted, and the canal prism is now in excellent condition from Sonyea to Dansville. Respecting the conditions imposed by the Superintendent of Public Works in this and other similar cases, attention is called to the communication submitted below, wherein reference is also made to a certain abandoned slip and basin in the village of Dansville:

ALBANY, N. Y., *June* 28, 1882.

To the Secretary State Board of Health :

DEAR SIR — Yours of the 27th inst. regarding drainage of abandoned Chemung and Genesee Valley canals, with communication of the local board of health of the town of Groveland in reference to work on certain portions of the Genesee Valley canal, received.

Our foreman, Mr. Berry, on the Chemung canal, has been instructed to work upon plans and carry out the suggestions agreed upon with engineer Kuichling, so far as such suggestions or instructions confine themselves to work upon canal lands from Millport to the Horseheads dam. The drainage of the long level, south of the dam, is not authorized by the appropriation, and no work on this portion of the level can be done or any money expended even if the liability of the village of Horseheads did not exist.

Mr. Kuichling informs me by letter that he has instructed Mr. Berry to remove some bars and debris at certain points in Catharine creek, between lock 45 and the upper cut in canal bank, through which the drainage is to be made.

I have written Mr. Berry that he must disregard these instructions ; that what work he does must be confined to the canal lands and that alone.

If Catharine creek has become filled up it must be opened by the adjacent owners, without expense to the State.

In the case of the Genesee Valley canal, Mr. Napier, who has charge, intended to commence work yesterday.

He has been instructed to confine his labors and the expenditure of money *entirely to the Dansville branch*, which extends from the Shakers to the village of Dansville, and to do his work according to plans suggested by your engineer, so far as possible, without conflicting with the rights of adjoining land-owners, it being my desire not to involve the State or its officers in any unnecessary litigation if possible.

I assume from Messrs. Kuichling and Evershed's reports that they will, with the assistance of the local boards, be able to so plan the work as to overcome any reasonable objections of adjacent owners.

Should any nuisance exist between the Shakers and Mt. Morris, on the main line of the canal, it should be abated by the railroad company, who own the land in fee.

The State should not be called upon to perform work on private property.

The railroad company is amply responsible financially, and in case any nuisance exists on its property which is detrimental to health, the local boards have sufficient authority, if they will but exercise it, to compel its abatement.

In regard to the slip and basin at Dansville, this property has been sold and conveyed by the State to Mr. John McCurdy, and the State has no title to or interest in the same.

The remedy for the abatement of any nuisance in the slip and basin rests entirely with the local board.

This department certainly cannot consent to any work being done or money expended by the State on the slip and basin.

Let me add in conclusion that I will cheerfully unite with your Board, through the foreman in charge, in doing all necessary work to relieve the people residing adjacent to the abandoned canals, as suggested by your engineer, with the hope that his recommendations will not be inconsistent with the appropriation, and that the same will be confined to State lands.

(Signed)

S. B. DUTCHER,
Superintendent Public Works.

(*c*) *Drainage of canal slip and basins at Dansville.*— In the village of Dansville, Livingston county, some trouble has arisen from the long canal slip, and two canal basins that have been abandoned. Of these latter, one is located in the village itself at the end of the slip, while the other is some distance southerly at the termination of the canal proper, near Mill creek. In regard to the former, it will be seen from the above letter of the Superintendent of Public Works that both the slip and the basin are now private property, and therefore should be dealt with by the local authorities, and as to the southern basin, no thorough examination of it and the attendant circumstances has yet been made on account of a misapprehension on the part of our inspector. The case will, however, receive early attention from the committee.

(*d*) *Abandoned Chemung canal drainage.*— Another extensive and highly important work that has been accomplished during the past summer by the Superintendent of Public Works, under the immediate direction of this Board, is the completion of the sanitary drainage of the prism of the abandoned Chemung canal, from the village of Millport to a point near the northern boundary of the village of Horseheads, and to which reference was made in 1881, on pages 30, 284 and 285 of the second annual report. The drainage of the numerous short levels from Havana to the long summit level, beginning at lock No. 45, at Pine Valley, and ending near the southern boundary of Horseheads, had already been completed, with only a few insignificant exceptions, during the summer of 1881; but there still remained the problem of removing the stagnant water from that portion of the summit level which had not been accepted by adjacent landowners and therefore continued to be the property of the State. The general conditions attending this work are outlined in the letter from Hon. S. B. Dutcher, referred to above, and also in the following report from the engineer employed to assist in preparing a plan for drainage:

Report on the Drainage of a Portion of the Summit Level of the Abandoned Chemung Canal.

By E. Kuichling, Civil Engineer.

Rochester, N. Y., *June* 19, 1882.

To the Secretary of State Board of Health:

Dear Sir — In accordance with instructions lately received from your Board to inspect the drainage works constructed last year by the canal authorities along the line of the abandoned Chemung canal between the villages of Millport and Horseheads, in Chemung county, and to indicate what further work should be performed upon this section in order to complete the sanitary drainage of the prism of said canal, the undersigned begs leave to state that on last Saturday, June 17, he made the required examination in company with Hon. George M. Beard, M. D., of Millport, Mr. W. E. Edmister, of the Canal Department, and Mr. J. W. Berry, the foreman under whose supervision the remaining work will be done; and herewith respectfully submits the following report:

From Millport southerly to the hamlet of Pine Valley, a distance of about three miles, the canal excavation winds through a deep and narrow valley, the bed of which rises very rapidly, thereby having necessitated the use of short levels and numerous locks when the canal was built; but at the latter place, the valley suddenly widens, and its bed quickly becomes broad and nearly level up to the village of Horseheads, four and one-half miles south. At a point about two miles northerly of Horseheads, there is, however, a very slight elevation or ridge extending across these flats, in consequence of which one portion of the surface drainage of the upper valley flows naturally in a northerly direction through Catharine creek into Seneca lake, while the remainder is carried southerly through Beaver brook and Newtown creek into the Chemung river. Between the above-mentioned ridge and Pine Valley, large areas of land are in a swampy condition, owing to the defective outfall afforded by Catharine creek, and almost the whole of the surface soil upon these flats is a rich, black muck, of remarkable fertility and value for gardening purposes wherever even slight drainage can be secured.

Through this upper valley, the long summit level of the canal was built at or near the foot of the hills on the western side, and all of the surface drainage from the latter is accordingly intercepted by the canal excavation, which has done much toward the improvement of the land. Some years after the completion of the canal, the Northern Central railroad was constructed through the whole valley, from Elmira to Watkins, and was located by its engineers upon the flats and hill-sides westerly of the canal, and very often in close proximity thereto, so that in many places and for considerable distances the railway embankment forms the present "berme" of the canal prism. By this construction, however, several natural depressions in the upper

valley between the canal and the hills westerly thereof, which formerly were overflowed by the water during the period of navigation and formed "wide-waters," were partially cut off from the main channel, thus leaving between the railway embankment and the foot of the hills a number of shallow pools of more or less magnitude, and having communication with the regular canal prism only by means of small passages or culverts at one end.

Upon the abandonment of the canal, the drainage waters which found their way into the various levels soon became stagnant and highly detrimental to the health of the residents of the valley. Complaint was accordingly made of this condition to the proper authorities, and in due time provision was made for effecting the sanitary drainage of all such portions of the prism as had not been formally acquired by the villages of Havana and Horseheads or the owners of contiguous lands. This important work was commenced a little more than one year ago by the Superintendent of Public Works, under the general direction of the State Board of Health; but as it could not be wholly completed before the heat of mid-summer necessarily put a stop to such operations, the execution of the comparatively small remainder was deferred until the present season.

Having thus briefly alluded to the topographical characteristics of the locality, and to the drainage works already completed along the line of the abandoned canal, I will now refer more specifically to the condition of those particular sections lying between the villages of Millport and Horseheads, remarking incidentally that from lock No. 2, near Havana, to the foot of lock No. 26, at Millport, the canal prism appears to have been thoroughly and carefully drained to the full satisfaction of all adjacent land-owners. * * *

From Millport southerly to the former aqueduct over Catharine creek, near the railway station of Pine Valley, the canal prism has been well drained by ditches and cuts through the towing-path bank; and in a number of places the contiguous land-owners have either partially or entirely refilled it, and used the area thus recovered for agricultural purposes. There are, however, along the course of Catharine creek, between lock No. 26 and the aqueduct just mentioned, no less than five (5) large mill-ponds, all of which require the careful attention of the local health authorities in order to prevent them from becoming serious nuisances and prolific sources of malaria. Large portions of the areas of these ponds are quite shallow and covered with a dense growth of aquatic plants, together with the usual green scum indicative of stagnation. The two last ponds of the series are in a worse condition than the others, and are owned respectively by Charles Hall and George Weiser. * * *

At the head of lock No. 44 is the beginning of the long summit level of the canal, extending from Pine Valley station to the village of Horseheads, a distance of about four and one-half miles. As already mentioned, the upper valley now becomes broad and has a nearly level bed, through which the channel of Catharine creek winds in a tortuous and sluggish course toward the almost imperceptible ridge, which divides the drainage waters from the slopes and causes one portion to flow northerly into Seneca lake and the remainder southerly into the Chemung river. From the levels taken last year by Mr. Thomas

Eversheed, division engineer of the western division of the New York State canals, the following facts have been deduced. First, that the canal bottom, at or near the head of lock No. 44, is about four and one-half feet above the mean low-water surface of the creek; and second, that at Dean's farm bridge over the canal, at a point about one and three-fourth miles above the lock, there is practically no difference in level between the beds of the prism and the creek, the latter being here nearly 800 feet distant in an easterly direction. Dean's bridge is thus in the vicinity of the low dividing ridge; and as there are no other available water-courses in the valley, it follows that the canal must here either be entirely refilled, or else that the prism must be used for conveying the intercepted waters to some points where a suitable outfall can be obtained. But since the village of Horseheads has secured by an act of the Legislature the privilege of maintaining a depth of water not exceeding three feet in the abandoned canal within its corporation limits, and has caused a tight earthen dam to be built across the prism at its northern boundary, it is obvious that the summit level cannot be drained southerly toward the Chemung river; and hence the northern outfall afforded by Catharine creek can alone be utilized for the drainage of the canal prism between lock No. 45 and the Horseheads dam, a distance of about three and one-fourth miles, in which an available fall of only about four and one-half feet can be obtained without disturbing the existing mill-privilege at Pine Valley station. With so slight a descent in so long a distance, effective drainage of the prism cannot well be expected; but as the canal for nearly the whole of this stretch is in an exceedingly bad condition, the latter can at least be greatly improved by concentrating the flow of the drainage waters into a narrower and deeper channel, instead of allowing them to spread out over the whole bottom.

In the consideration of the problem here presented, it must be remembered that the canal authorities are restricted to the drainage only of those portions of the abandoned canal prism which still remain the property of the State, and that the improvement of adjacent swampy or saturated private lands is not to be taken into account. Large tracts of such land are found on the eastern side of the canal between Pine Valley station and Dean's bridge, but their reclamation or drainage must be accomplished by the individual owners. The recommendations which I have made to the foreman in charge of the work at present being done by the State, are accordingly of such a nature as to cause the abatement, so far as possible, of the nuisances upon the State's lands alone upon this summit level, and any advantage that may thereby accrue to contiguous territory will be purely incidental. The general plan proposed herewith for the sanitary drainage of the summit level from the waste-weir near lock No. 45 southerly to the Horseheads dam may briefly be stated as follows: * * *

1. A drainage ditch shall be cut along the canal bottom from the waste-weir outlet, about 750 feet south of lock No. 45, to a point at or near the farm-roadway bridge over the canal upon the lands of Wilson Dean, no release by adjoining owners, except the Northern Central R. R. Co., having been filed on this section. The ditch to be at least four and one-half feet deep at the waste-weir outlet, and about three and one-half feet wide on the bottom, with a uniformly ascend-

ing grade of about one foot in 3,800 feet, or about seventeen inches per mile, whereby its depth at Dean's bridge would be nearly twenty-four inches, the distance being almost one and three-fourths miles. From this point southerly to the Horseheads dam, a distance of about one and one-half miles, the title to the abandoned prism has been properly acquired by the contiguous land-owners, if my information is correct, and hence the duty of draining this section will obviously devolve upon them. But as an outlet for the intercepted waters is here feasible only through the canal excavation, I have accordingly considered that a suitable channel should be provided at Dean's bridge, into which the water might be conducted.

2. To prevent the ditch from becoming filled up with the sand and shingle washed in by the intercepted brooks or water-courses from the western hill-sides, catchment-basins or areas of sufficient size must be constructed and maintained, in which the heavy material carried along during freshets will become deposited, and leave only comparatively clear water to escape into the new drainage ditch. As all of the intercepted streams between lock No. 45 and Dean's bridge flow across the lands of the railway company, and also since the said company has already filed releases for the adjacent portions of the canal prism, it follows that in order to secure a reasonable degree of permanence for the work now being done by the State at large expense, the said Northern Central Railroad Company should be required to provide and maintain such catchment-basins, or other devices for preventing the deposit of sand, stones, etc., in the new ditch, whereby the free flow of the water in said ditch would be obstructed. A failure to comply with this condition as soon as possible will render the present drainage work utterly useless, and will quickly restore the extremely unhealthy state of the prism that now exists.

3. By the system of drainage herewith proposed, the canal excavation will remain an interceptor for the waters from the western slope of the upper valley, and will also act as a reservoir in times of heavy rain, from which the accumulated water can be gradually emptied into Catharine creek through the waste-weir outlet near lock No. 45. The ditch in the bottom is of sufficient size and grade to remove the ordinary permanent discharge from springs and saturated sub-soil, but it must be kept free from obstructions, and appropriate conditions should be made for its maintenance in the future releases. The flow in the ditch will naturally be quite sluggish, yet the water surface exposed will be greatly reduced in dry seasons from its present condition, and the marshy bottom of the prism will be converted into relatively wholesome soil. Between Dean's bridge and the dam at Horseheads, the owners of the canal excavation should be required either to continue the ditch prepared by the State, or else to partially refill the prism from said dam northerly so as to gain a slight fall in the bed toward Dean's bridge; and the above described plan of concentrating the drainage into a narrow and deep ditch will here also be found effective as well as economical. The only manner of securing the execution of the work through this second section is sufficiently indicated in the general drainage laws of the State, and it will become the duty of the local health authorities to see that the necessary steps therefor shall soon be taken.

Having thus outlined the general plan for the sanitary improvement of the upper or summit level, I will now continue with the specification of the several items of work that should, in my opinion, be performed by the State, and also by the railway company.

* * * * * * * *

The canal bottom from the waste-weir outlet to a point about 5,800 feet southerly is in tolerable order, as it was ditched last year, and the accumulated waters were permitted to escape through three cuts made in the towing-path bank in the vicinity of and opposite to a railroad culvert. At the latter point the surface of low water in the creek is only about two and a half feet below the bed of the prism. * * *

For a distance of about 500 feet south of the above-mentioned culvert, a ditch was cut in the canal bottom but was not continued sufficiently far to secure any substantial relief for the remainder of the section to the Horseheads dam. The new ditch should, therefore, be continued on the same grade through the prism as in the preceding section, but its width on the bottom may here be reduced to three feet from said culvert to a point opposite the opening in the railway embankment for the drainage of a long and narrow pool or marsh on the western side thereof. This pool appears to have been a "wide-water" of the canal, but is now separated from the latter by the railroad, and has developed into a serious nuisance. As it is wholly upon the premises of the railroad company, its owners should be required to drain it as soon as the outfall has been provided. There is also in this section of the canal one or two other culverts under the railway which discharge considerable silt into the prism, and which will require the construction of catchment-basins upon the lands of the railroad company in order to prevent the obstruction of the new ditch.

Between the pool referred to and Dean's bridge, the drainage ditch in the canal bed should be continued on the same grade as before, but its width on the bottom may be diminished to about two and a half feet. In this section two small culverts under the railway bank convey the drainage of the western hill-sides into the prism, and similar precautions to prevent the filling up of the ditch must be observed at those places as are necessary elsewhere.

In the excavation of this ditch from the waste-weir outlet to Dean's bridge, or the end of the premises still owned by the State, the earth removed should be cast out against the sides of the prism and then be properly graded or trimmed, so as to leave the bottom uniformly sloping toward the trench, instead of being piled up in the form of one or two ridges behind which the water will accumulate and become stagnant.

The remainder of the canal from Dean's bridge to the dam at Horseheads has been acquired by the contiguous land-owners, and its drainage will, therefore, come under the direction of the local health authorities, as has already been intimated. The water in the prism is about two feet deep throughout the entire section, and is covered with the usual scum of algae. It is derived mainly from the lateral drainage ditches constructed for the improvement of the marshy and saturated lands easterly of the canal; but by the methods indicated in the foregoing, I believe that all of the water can be effectually removed during the dry seasons and the existing nuisance reduced to one of very much smaller magnitude.

In conclusion I would also remark that the drainage of the summit level of the abandoned canal would be greatly facilitated if the southerly outfall toward the Chemung river could be made available by the drainage of the prism within the corporation limits of the village of Horseheads. The water here retained is about three feet in depth and is evidently in an extremely unwholesome condition throughout the greater portion of the section, which is about one and one-fourth miles long. Aside from the rain-fall, it is derived from a number of springs in the bottom near the dam; and when the accumulation reaches a certain height it overflows through a waste-weir into Newtown creek. The inhabitants and officers of the village are beginning to realize the evil effects of such a large area of stagnant water and are now anxious to return to the State the privilege which they have acquired by legislative enactment.

Respectfully submitted,

EMIL KUICHLING,

Civil Engineer.

Work was commenced very soon after the inspection by the engineer, and was continued until it became evident that the funds available for this drainage would not be sufficient to complete the large ditch that had been planned, and hence the general directions to the foreman in charge were modified so as to abandon further work on the large ditch and so to secure the drainage of the worst section of the summit level, beginning at Dean's bridge and extending about 4,800 feet northerly to the large cut made in the previous year through the towing-path bank. This section of the canal was accordingly ditched in a proper manner and with excellent results. The bottom of the prism is now virtually dry between the points mentioned, and the former swamp has been replaced by a narrow stream of running water, whose surface is usually from eight to sixteen inches below the canal bed. In the section south of Dean's bridge, the canal prism had become the property of the adjoining land-owners; hence the Superintendent of Public Works made no effort to do more than to provide an outlet through the above-mentioned ditch for the stagnant water thereupon. By said outlet, however, the depth of the water was soon reduced from about two feet to only a few inches; and with proper effort on the part of the owners, at least one-half mile more of the prism south of Dean's bridge can now be drained. To remain effective the new ditches must furthermore be guarded from becoming obstructed by the deposit of silt, pebbles and stones carried along in times of heavy rain-fall by several runs or natural water-courses, which pass through culverts under the track of the Northern Central railroad and empty into the canal prism; and as the railroad company has become the owner of half of the prism at all of these points, it seems to be clear that the duty of preventing the obstruction of the new ditches from the sources indicated belongs to said corporation alone.

It will be observed from a perusal of the foregoing report of the engineer and the preceding remarks, that the only natural difficulty to the complete drainage of the entire section of the summit level still remaining the property of the State is the lack of a convenient and suitable outfall. The natural water-courses in the valley are actually

higher than the bottom of the prism in the vicinity of the low dividing ridge; but with an improvement of their channels, the drainage of the canal would be greatly facilitated, and large areas of wet and swampy land could also be reclaimed. This work, however, could not be undertaken by the Board, since under the existing statutes relating to drainage, all such improvements can be executed only by the land-owners interested. Accordingly, as the latter could not be induced to incur the necessary expense for providing outfalls, the drainage of this section of the summit level was limited by the attendant conditions.

From advices and reports of physicians residing in the districts where the canal has now been drained, the sanitary improvement appears to be eminently successful and fully justifies the action and expense incurred by the State.

(*e*) *Cost of the drainage works executed by the State on the abandoned Chemung and Dansville Branch canals.*—Before leaving the subject of the abandoned Chemung and Dansville Branch canals, it may be of interest to refer to the expenditures of the Department of Public Works under act chapter 593 of the Laws of 1881, by which an appropriation of $6,000 was granted for the purpose of removing the stagnant water from the State's property along the line of the said canals. The work has extended over a period of two years, and was executed by the Superintendent of Public Works, under the general direction of the State Board of Health. There has been expended in the sanitary drainage of these two canals during 1881 and 1882:

1. On the Chemung canal	$3,309 21
2. On the Dansville Branch canal	1,469 77
Total	$4,778 98
Thus leaving on hand a balance of	$1,221 02

This balance left from the original appropriation will be sufficient to complete all that requires attention next spring on the line of these two canals, so far as such work can be completed without the co-operation of the local authorities and residents directly interested and benefited.

(*f*) *Drainage of Summit level of Chemung canal in the village of Horseheads.*— At Horseheads, the existence of an extraordinary number of cases of malarial fever is ascribed to the stagnant water contained in the section of the canal embraced in the village limits, a distance of about one and one-half miles. The control over said section was given by special legislative enactment (chapter 379 of 1880) to the village, and the water is retained therein by dams at each end. Relief can easily be obtained by draining southerly into Newtown creek, but the expense involved seems to be greater than the village is inclined to pay, and hence an appeal for aid will perhaps be made to the Legislature. It should here be remarked that the sanitary condition of the entire district from Pine Valley to Horseheads cannot be permanently improved without

resorting to a comprehensive system of drainage and regulation of the natural water-courses; and that such an improvement is rendered extremely difficult, if not practically impossible, in consequence of the absence of suitable laws to govern cases of this kind where a number of different townships and corporations are interested and should co-operate in bringing about greatly needed results.

(*g*) *Abandoned old canal in the village of Fairport.*— In the village of Fairport, county of Monroe, the local health authorities attributed the prevalence of malaria to the existence of two abandoned sections of the original Erie canal, one at the eastern and the other at the western side of the village. An engineer was sent by the Board to examine the locality, and a clear presentation of the case is contained in the following report:

ROCHESTER, N. Y., *April* 19, 1882.

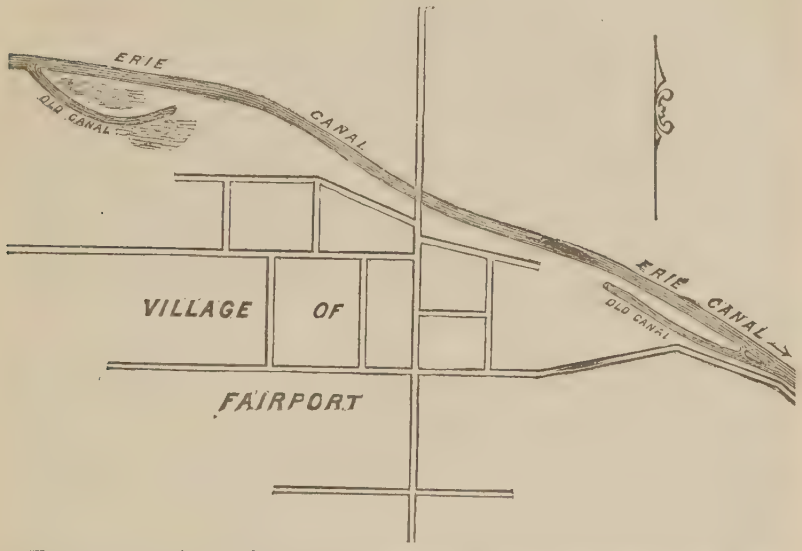
To the Chairman of Committee on Drainage, Sewerage and Topography of the New York State Board of Health:

DEAR SIR — In accordance with instructions received from your Board on the 15th inst., to examine certain nuisances existing in the villages of Fairport and Spencerport, in Monroe county, and described in the inclosed memorials from the inhabitants of said villages, the undersigned begs leave to state that he visited the localities mentioned, on the 17th inst., and submits herewith the following report:

1. At Fairport, in the town of Perrinton and county of Monroe, there are two sections of the old Erie canal, as originally excavated but now abandoned, located respectively on the eastern and western sides of the village, but wholly within the corporation limits. These excavations lie on the southern side of the present enlarged canal, being separated from the latter by comparatively narrow strips of earth and having communication therewith at only one end, as will be seen from the appended diagram or sketch.

During the period of navigation, these two portions of the abandoned canal became elongated pools of stagnant water, lined with a profuse growth of aquatic plants, and form moreover convenient receptacles for retaining any floating matter that may find its way into them from the main channel. Situated also near the foot of an extensive hill-side with gentle slopes, they furthermore intercept a considerable amount of surface drainage, and as the water in these pools has no current, all substances of organic origin carried down from the fields by storms will tend to lodge in them and assist by their decay in the development of malaria. The eastern section, of which particular complaint is made, seems also to have been used as a dumping-ground for various kinds of refuse, notably that from fruit-canning establishments, whereby its sanitary condition has not been improved. This excavation, which is about 1,000 feet long, forty feet wide and four feet deep, is very close to the present canal, the intervening strip of earth varying in width from fifteen feet to fifty feet; and for half of its length it extends along a highway bordered by numerous dwellings, while the

remainder is in the rear of a thickly-settled portion of the village, so that an east wind will waft the noxious vapors arising from it into almost every house.



To remedy this evil I would suggest for your consideration two plans, the first being to fill up the entire excavation with fresh and wholesome earth, and the second involving the removal of the narrow bank of earth which now separates the nuisance from the present canal, thus forming a "wide-water." The latter plan is somewhat less expensive than the former, since no damages to land are thereby incurred; but the entire refilling of the old excavation would be more satisfactory to the inhabitants of the village. The cost of removing the intervening strip of earth will probably not exceed $450.

The second section of the abandoned canal, which is located in pasture land near the western boundary of the village, is about 700 feet long, forty feet wide and four feet deep, and has the form of a curve at first receding from and then approaching the new or enlarged canal, as indicated upon the diagram. The greatest width of the segment of land between the present and former channels is about 100 feet, and upon this area there are two small patches of swamp. Adjacent to the old canal the original surface of the ground is low, and when the Erie canal is in operation, the soil becomes saturated, thereby facilitating the growth of reeds, rushes and other aquatic plants.

On account of the considerable distance between the two channels, which varies from forty to one hundred feet, as well as from the fact that there is close at hand a large quantity of earth which was removed from the prism of the new canal during its construction and deposited in the form of "spoil-banks" upon the adjacent land, it seems to me that the simplest and cheapest method of effectually disposing of this nuisance will be to cause the abandoned excavation to

be entirely filled up with the material from the spoil-banks just mentioned, especially since the latter constitute by their height a barrier to the natural surface drainage from the slope of the hill to the south. I estimate that the volume of earth required to fill up this portion of the old canal will be about 4,000 cubic yards, and that the expense of the work, if judiciously performed, will not exceed $350. In this solution of the problem, the nuisance in question will not only be permanently abated, but an area of about one and one-half acres of valuable farming land will also be reclaimed, which might afterward be sold to the contiguous land-owners, whereby a considerable portion of the amount expended upon the improvement might be recovered. It may also be remarked that in view of the benefit which the surrounding land will derive from the filling up of the old excavation and the removal and grading of the spoil-banks alluded to, the owners of the adjoining lands might perhaps consider it sufficient compensation for performing this work to receive from the State a title to the area thus reclaimed.

As this matter immediately concerned the canal authorities, it was accordingly referred to the Superintendent of Public Works; but owing probably to lack of funds for performing such work, action in the premises was limited to making one or two additional openings through the narrow strip of bank separating the new from the old canal in the eastern section. The relief obtained by this procedure, however, is stated to be entirely insufficient by the village board of health.

(*b*) *Abandoned old Erie canal in the city of Rome.*— A similar, but more extensive nuisance, arising from stagnant water in the abandoned original Erie canal extending through the entire southern portion of the city of Rome, Oneida county, was also brought to the notice of the Board. The general facts relating to this case are contained in the subjoined report of the engineer:

ROCHESTER, N. Y., *December* 1, 1882.

To the President of State Board of Health:

DEAR SIR — Permit me herewith to transmit to you the following results of my inspection, made by request of your Board, on October 7, 1882.

On the Abandoned Canal Nuisance at Rome, N. Y.

In the southern portion of the city of Rome, in Oneida county, a section of the original Erie canal, about two miles long, has been abandoned by the State; and as the bottom of the prism is virtually level, and no adequate provision for draining it appears to have been made, the natural surface drainage from the adjacent level territory necessarily accumulates and becomes stagnant therein, thus giving rise to considerable malaria among the residents of the locality. It is of this section of useless canal that complaint has been made and the assistance of your Board invoked by the citizens for procuring relief from the nuisance through the canal authorities.

The ground on both sides of the abandoned canal is quite flat for long distances, and from the black appearance and peaty character of its surface layers, it presents unmistakable evidence of having formerly been a swamp or marsh. Through this soil the canal prism was excavated, and when it was subsequently rendered useless by a change in location of the enlarged Erie canal to a more desirable route somewhat further north, the old channel served only as a drainage ditch for the district, with an outlet into Wood creek at the south-western corner of the city. This flat area under consideration is merely the small central portion of the almost level bottom of the broad valley which extends east and west through the middle of the county, and which is drained easterly by the Mohawk river and westerly by Wood creek and other small streams into Oneida lake; and being thus on the indefinite summit separating the two great drainage areas, the proper method of removing the water becomes a subject for careful study.

At the eastern end of the section of the abandoned canal, a small creek naturally tributary to the Mohawk river has been partially dammed by the canal authorities, so as to divert the summer flow of said creek into the canal prism, with the view of creating therein a current running westerly to the outlet into Wood creek about two miles distant, and thus preventing malaria. The volume of water in the former creek is, however, so slight in dry seasons, and the dam at the junction with the canal is so much out of repair, that very little relief for the unsanitary condition of the long line of old prism can be secured from this source, even if it were practicable to obtain sufficient fall toward Wood creek. Small bars have also washed into the bottom of the prism at various points from road embankments and lateral drainage ditches, which; in conjunction with a profuse growth of aquatic plants, obstruct the flow of the water and render it stagnant and offensive.

But, in addition to the nuisance caused by the stagnant water and the vegetation in the abandoned canal, the latter is furthermore defiled by receiving the contents of a large public sewer in James street, as well as the wastes from a number of adjacent houses from Williams Bros.' knitting mill, and from Etheridge & Co.'s petroleum tanks. The James street sewer is still quite new, and is intended nominally for sub-soil and surface drainage purposes alone ; but it is safe to predict that before long the organic wastes from a large number of dwellings will be conducted into it, and hence find their way into the canal excavation. The outlet of the private sewer from the knitting mill is strongly marked by appreciable deposits of fæcal matter, paper, cotton and wool-yard wastes, and a white substance resembling lime. A short distance westerly is found the outlet of the drain from the petroleum tanks and oil-warehouse above mentioned, which occasionally delivers considerable oily matter into the prism. From the knitting mill sewer outlet to the junction with Wood creek, the general condition of the old canal may fairly be characterized as very unhealthy during the summer months at least.

Close to the western end of the section, the outlet from a canal dry-dock enters the abandoned prism ; and as the sluggish and small creek cannot carry off with sufficient rapidity the large volume of water which is quickly discharged in emptying the dock, the prism accord-

ingly becomes partly filled, thereby setting back the water for a long distance easterly and raising its level until the discharge from the dock ceases, whereupon the surplus water gradually flows away through the creek. We, therefore, also have here in the summer season a fluctuating water level in addition to the other sources of complaint.

Wood creek, which is thus the general outfall for all of the drainage and liquid wastes enumerated in the foregoing, is a small stream flowing slowly in a very tortuous natural channel through the level peat fields for a considerable distance westerly of its junction with the old canal; but its bed afterward has a greater declivity, so that a suitable outfall for an artificial drainage system can readily be found. An improvement was attempted during the past summer by the excavation of a long ditch about four feet wide straight across the fields owned by George Hammill, from the western end of the old canal to a point where the creek has a little more descent than above; but as the ditch was cut through the peat with vertical sides, the latter soon began to cave away and serious bars were formed, thus partially neutralizing the benefit derived.

The case under consideration is plainly one of originally inadequate drainage, combined with a sewage pollution that has not yet reached formidable proportions, but which is extremely liable to increase year by year. I have, therefore, recommended to the local health board to give the matter the most careful attention, and to cause the necessary surveys and plans for the sewerage and drainage of the entire low district of the city to be prepared, and then to coöperate with the canal authorities in the proper and permanent abatement of the nuisance. As I was not authorized by your Board to make an extended survey at this time, no definite plan can now be submitted, and the suggestion is ventured that the question of the drainage of the abandoned canal section be referred to the proper canal officials for examination and report. In regard to the disposal of the sewage from public and private sewers and drains, the municipal authorities should deal with this subject promptly and independently.

The drainage problem will, in my opinion, admit of a comparatively simple solution, and its cost should be defrayed by the several parties to whom the responsibility and the resulting benefits legitimately belong. The sewerage problem is another and distinct matter, the consideration and execution of which is the duty of the city alone.

Respectfully submitted,

EMIL KUICHLING,
Civil Engineer.

From the foregoing it will be seen that the radical solution of the problem involves not only considerable research and field-work by the canal engineering department, with reference to the natural watercourses in the low or marshy districts, but also the coöperation of the municipal authorities in providing a suitable outfall for the surface drainage and sewage of that portion of the city. As we are not advised that any further steps have been taken in the matter, no additional remarks are here necessary.

II. Obstructed Natural and Artificial Water-Courses and Miasmatic Disease in Rensselaer, Washington, Oneida and Monroe counties.

(*a*) *Obstructions in the Hoosick river near the village of Schaghticoke.* — First among complaints received by this Board through the Governor with regard to malaria caused by stagnant water in obstructed channels, we mention the case of the village of Schaghticoke, in Rensselaer county, to which reference was made by the Board in its first annual report, and which has been made the subject of certain executive orders by the Governor.

It appears that some thirty years ago the northern, which was then the principal, branch of the Hoosick river was obstructed by a high railway embankment at a point just beyond the village limits; and that, in consequence of this obstruction and the resulting diversion of the stream into a channel that was formerly of secondary importance, the water in the obstructed branch of the stream became stagnant, thereby causing miasmatic emanations and after many years inflicting a vast amount of suffering upon the residents of the village. The malaria has been steadily increasing for several years past, and has at length attained such intensity as to bring the greater part of the entire population of the large village under medical treatment. Owing to the peculiar relations of the railroad corporation, which claims the ownership of the said embankment, to the construction company now working that railway, and also to the many hindrances of a technical and legal character that were from time to time interposed, the abatement of the evil could not be procured under any order or action by the village or town authorities; therefore the matter was brought to the attention of this Board, by the Governor's order through petitions and statements received by him. Repeated examination and continued investigation in the locality have been duly made.

The medical facts connected with this miasmatic locality have been studied by physicians practising there and by officers of the State Board of Health, and it is considered that there is no longer any doubt that, whatever may have caused the introduction of malarial germs at Schaghticoke, the long chain of stagnant pools grown full of aquatic vegetation, and having a long extent of mud margins, sufficiently account for this miasmatic poison that now afflicts the populous village which lies just to the west of the eighty acres of uninhabited flats that have been cut off by the said embankment, as shown in the disease map found in a subsequent chapter of this appendix, and partially delineated upon the small chart here following as part of Engineer Kuichling's report.

As was shown in the Board's first annual report (pages 190–192) the accusation by the local board of health was from the first against the continuous stagnant pools caused by the railroad embankment obstruction. This committee found this accusation fully confirmed; and that, notwithstanding that many years elapsed before these pools became so filled with decaying organic matter as to prepare a hot-bed for malaria, there is no doubt of the fact, that the entire eighty acres of flat-land, through which these old channels, now pools, have their

course, have become productive of the miasmatic diseases which afflict the locality beyond.

The accompanying affidavit, made by two of the oldest and most trustworthy citizens who gave testimony before this committee in 1880, serve to clear up any doubt the readers of this report might have concerning the former salubrity as well as of the recent causes of unhealthfulness in that locality.

Affidavit of Edward N. Masters and James Camfield:

RENSSELAER COUNTY, *ss.:*

James Camfield, of said county, being by me duly sworn, deposes and says that he resided in Schaghticoke, in said county of Rensselaer, at the time and prior to the construction of the railroad track through and adjacent to the village of "Hart's Falls," in said town of Schaghticoke, and now resides there; and that he knows the fact, that until the construction of said railroad, the Hoosick river flowed toward Schaghticoke point in two channels for a distance of more than half a mile, before reaching said point at which the separate channels and streams united in one; and further that the western or right channel seemed to be the main stream of the river at the dividing ridge of the rock-bed of the river where the two channels and streams of said river took their courses to the right and left as flowing onward toward said point known as the village of Hart's Falls, now Schaghticoke; and further, that in the construction of said railroad the said western channel and stream were completely obstructed by filling in and making an embankment along and near the ridge of rock, upon and by which the river was turned into its aforesaid two channels and separate streams so that there has until the present time ceased to be any current or flowing of said river through said western channel; and further, that the bed of said channel and all its accessory and cross or connecting channels by which numerous islands are formed between said main and now stagnant channel, and the railroad track, which is a continuous embankment throughout the length of the aforesaid track of lowland, from the said place of obstruction to the aforesaid point, has become a vast stagnant pool and series of connecting pools in which there is no current. Whereas, before said obstruction the western channel in diverting the waters of the river, as herein described, there was a constant current and movement of the streams in all the channels and that in those days the entire vicinity was known to be remarkably healthful.

JAMES CAMFIELD.

Subscribed and sworn before me,
this 9th day of August, 1880.

EDWIN BURLINGAME,
Notary Public, Rensselaer county, N. Y.

(The affidavit of Edward N. Masters is precisely the same as the above.)

The Board's first report to the Governor fully substantiated the complaint from the residents of the village, whereupon an order was issued by the Governor requiring the parties who are responsible for maintenance of the nuisance to abate it in accordance with certain specifications which he made.

The following is the text of the report made by the Board to the Governor:

"We find that miasmatic diseases have become so prevalent that a large proportion of the inhabitants of the village, perhaps even a quarter, have been suffering from the evil during this summer.

Miasmatic diseases do not seem to have been noticeable in Hart's Falls until about five years ago. Since that time they have affected a greater number each year. The power of the evil has evidently been increasing, until now it has reached such proportions that immediate relief is imperatively demanded to prevent further suffering and loss of life.

The cause.— The cause of the disease, in our judgment, is to be found neither in the water supply nor in the local drainage. The greater part of the persons affected drink cistern water, and the remainder well water. The condition of drainage shows nothing unusually unhealthful. The fact that most of the persons affected by malaria live on the east side of the town leads us to look for some unhealthful condition near this locality. The eastern part of the village is built on a high bank immediately overlooking the chain of shallow, swampy pools on a uniform level, occupying what was once a bend three-quarters of a mile long, in a main channel of the Hoosick, but is now by the B. H. T. & W. R. R. embankment, cut off from the river, whose stream is turned into another course. The pools cover an area of about three and a half acres; but owing to the tortuous forms of the old channels they have probably three miles of shore line, much of it with a swampy border. The water is filled with algae. The lower end of the chain of pools opens through a narrow cut in the railroad embankment into the Hoosick river, where the water is backed up from the paper mill dam. Sometimes the water runs from the river into the pools, and sometimes from the pools into the river, depending upon the height of the water above the dam, which is affected both by the floods and by the commercial uses of the stream. By the successive backing up and outflow of the river water, through the culvert, the surface of the pools fluctuates, leaving at times a margin covered with decaying algae, exposed to the sun, where a few days or hours before, the water had been several inches deep, or even several feet, in case of unusual floods. When a body of water contains a large amount of organic matter, the exposure of its shores below the usual water line in hot weather is now believed one of the most favorable conditions for the production of malaria. The old channel pools at Harts Falls, having the requisite condition of excessive vegetation and fluctuating water surface, are, therefore, in our judgment, the cause of the miasmatic diseases which prevail in the village.

The remedy.—There are three methods of treating the old channel pools, which, with a greater or less degree of certainty, may be expected to render them partially or wholly harmless.

The first is to permanently cut off all communications between the

pools and the river, and by cutting through or around the rocky point at the south end of the town, drain the water from the pools into the river below the paper mill dam. Tile drains would then have to be laid in the old channels and the exposed bottom covered with dry earth. The outfall is reported by the surveyor to be sufficiently great to thoroughly drain the whole area. The low ground included within the railroad embankment would doubtless be rendered healthful by being thus thoroughly drained and covered; and there is every reason to believe that malarial disease would essentially disappear from Hart's Falls.

The second method is to convert the old channel into a pond with a slow current whose surface shall be kept at a uniform level by a dam at the lower end. This plan requires that an eighteen-inch tube should be carried from the present channel of the river under the railroad embankment to the upper end of the old channel, and made to discharge into the upper pool. Arrangements should be made to turn the river water into the tube, and it should be given fall enough for rapid discharge. The amount of water admitted into the tube would be controlled by a gate. At the lower end of the old channel, between the abutments of the short bridge in the railroad embankment, a dam would be required with flush boards or a gate high enough to keep out the river floods while allowing free overflow from the pond in ordinary stages of the river. The surface of this pond should be at least a foot higher than the present level of these pools. The water would then cover most of the swampy places, and have a more abrupt shore line than at present. Although this pond would necessarily retain much of the vegetable growth now existing in the old channels, which is a source of danger, yet the removal of the condition of shores alternately covered with water and exposed to the air would probably afford partial relief from the malarial influences. The permanence of this remedy cannot be predicted with certainty, but it is probably the cheapest and most quickly applied; and will interfere with the vested water rights of the powder mill much less than an attempt to restore the river to its old channel.

The third method of relief is to restore, as nearly as possible, the old conditions, by making a large opening in the railway embankment and cutting down the rocky bar at the head of the old channel so as to allow a large part of the river to flow, as it did formerly, by the north branch. The floods would soon sweep out much of the accumulated vegetable growth, and to a certain extent scour the banks. The current in this branch of the river would not be strong at ordinary stages of water, for it would still set back from the paper mill dam up the old channel. This paper mill dam, as reconstructed within the past few years, forms such an impediment to the outflow of the river that the former current of the old channel cannot be restored by simply admitting water at its head, nor will the amount of water admitted be as great as formerly. The current might, however, be sufficient to keep the river healthful, aided by the action of floods, were it not for the oscillations caused by such water from the paper mill dam at low water when there would be no flow through the north channel. While this method of treating the channel would probably afford some relief for the village from malarial trouble, it would be difficult to carry out on

account of its interfering with the use of the water by the powder company, and the expense of the large cutting and bridge at the railway embankment.

The execution of the Governor's order has been delayed because of claims set up by the owners of the hydraulic franchises on the south and only channel of the river in view of the fact that said order required the reopening of the old flood-way into the north channel; and the Board was required by the Governor to continue its examination of the facts, and to report to him. It was also claimed by this committee and by others that even if that order was executed, the river had in thirty years worn its south or left-hand channel so deeply that it would not give an inflow through its original course to the north channel in periods of drought. Accordingly, on September 18, 1880, the following report was made upon the conclusions reached after the results of further engineering examination, as hereto annexed, were considered.

This Board merely formed the conclusions presented concerning the second, and, as believed, the best plan submitted by this committee and recommended in the report of 1880. It recommends that the pools be transformed into a controllable artificial lake, with a large and constant inflowing eastward, and a corresponding outflow at the southwest point of miasmatic area. All such outflowing to be governed with mechanical certainty.

To the State Board of Health:

In accordance with recent instructions from your committee on drainage, sewerage and topography, to examine the malarial nuisance caused by stagnant water in former channels of the Hoosick river at the village of Schaghticoke, in Rensselaer county, N. Y., the undersigned begs leave to state that on the 6th inst., in company with Dr. Harris, Dr. Hunt and Hon. Erastus Brooks, of your Board, he made such examination, and would now submit the following report:

The locality under consideration has already been described so fully in former reports made to and by your Board that any further allusion on my part to the topographical and geological characteristics of the district is superfluous; and I will, therefore, only invite your attention to the accompanying map, which I have carefully reduced from a large tracing kindly loaned to me by Mr. A. Sipperley, of Schaghticoke, who caused it to be accurately surveyed and drawn by a local engineer; and who vouches for its correctness. As I could not obtain a leveling instrument in the village, I was accordingly unable to test the levels of the water surface at different points, and hence my conclusions are predicated entirely upon the data submitted.

It appears that prior to the construction of the railway embankment now owned and occupied by the Boston, Hoosac Tunnel and Western Railroad Company, the Hoosick river flowed through an alluvial area on the eastern side of the village in three distinct longitudinal channels, which were connected by two transverse channels, so as to form four large islands, as shown upon the map. Of these channels the middle one seems to have been the principal watercourse, thus making the course AEDFC (see map) the former main channel. The railway embankment was built across the two

islands included between the middle and southern channels, to a height of about thirty feet above the general water surface of the stream, and in such manner as to completely cut off or obstruct the former main course AE, and the subsidiary course BD. At C, however, an opening about forty-five feet wide was left in the embankment through which the drainage waters, intercepted directly by the former channels, could find an outlet into the river, and which served, also, to admit the water from the river into the old channels, and there become stagnant. The rapid fall of the river affords an excellent water-power, which has been developed in this particular locality by the dams K and L, of the powder company, and the dam M, of the paper mill, all of these dams and water privileges having been in existence substantially as at present long before the railroad was built. By referring to the levels inscribed upon the map, it will be seen that the water in the present main channel of the river is set back by the dam M, so as to flow through the opening C, thus rendering a direct drainage of the former channels impossible without serious damage to the water-power of the paper mill.

The periodical drawing down and refilling of the pond or reservoir created by the dam M, in dry weather, lowers and raises the water surface in the former channels, so that large areas of muddy margins of the said channels are alternately exposed to the sun and then again covered with water, conditions peculiarly adapted to the development of malaria. As these stagnant-water channels north of the railroad bank have been declared a nuisance and dangerous to the public health the problem now is to indicate how relief can be obtained.

For this purpose two general plans are herewith submitted for your consideration; the first being the closing of the opening at C, and the drainage of the basin and channels by means of a suitable culvert or tunnel piercing the rocky ridge upon which the main portion of the village is built and emptying into the river at some convenient point northerly of the dam M, where ample fall therefor can be secured; while the second plan contemplates the restoration of a perpetual current in the former channels by admitting, through a new opening to be formed in the railway embankment at the point B, a large proportion of the whole flow of the river into said channels, whence it will escape through the present opening at C. Both of these plans are practicable *per se*, but each involves a large expense, and the consideration of numerous complicated interests.

In the drainage plan, there is involved the question of the undeveloped water-power owned by the powder company, northerly of the railroad between the old channels BD, and AE, so that without a full knowledge of the intentions of said company with regard to any transfer of water-power from the ponds created by the dams K and L to the old main channel EDF, no definite dimensions can be determined for the outlet tunnel. The diversion of any such water from the stream at K or L and its discharge into the river below the dam M would also cause damage to the water privilege of the paper mill, for which compensation would doubtless be demanded. It will thus be seen that serious difficulties invest this method of abating the nuisance unless the owners of the two water privileges mentioned arrive at a satisfactory understanding. Could an agreement of this kind be concluded,

it is my opinion that the construction of the drainage tunnel or culvert would be the best and most economical solution of the problem.

Since, however, neither the powder company, nor the paper mill owners appear to have been in any manner responsible for the creation of the nuisance complained of, it is difficult to see how any order can be issued which will affect their rights and legally acquired privileges; and hence, without their voluntary coöperation in the drainage plan, some other mode of relief must be devised. The second plan suggested above simplifies the subject greatly and divests it of the complications just mentioned, besides being nearly as efficient in affording relief.

As already stated, the second plan involves the production of a constant current in the water now stagnant in the former channels by the introduction of a liberal supply from the present channel at a point further up stream where a fall sufficient to induce motion can be obtained. If such supply were to be taken from the pools or ponds above the dams K and L, the water privileges of the powder company would suffer injury; and hence it is obvious that, in order to avoid tedious litigation, the water supply should be introduced below the lower dam L of said company. Fortunately for this plan, the lower dam has within the past year been moved about 200 feet up stream, from its former position, and is now located upon a rocky crest or ridge in the river bed, between which and the surface of the water at B there is several feet fall. By referring to the levels (see map) it will be found that from B to D and from B to C, there is a fall respectively of $(72.18-71.24) = 0.94$ feet $= 11\frac{28}{100}$ inches and of $(72.18-71\ 05) = 1.13$ feet $= 13\frac{56}{100}$ inches. With such a descent and a sufficient volume of water, a current of about two feet per second, or nearly one and one-half miles per hour, can readily be obtained in the former channels; and if a strong dam or embankment be thrown across the former channel at D, the water introduced at B will flow around the whole "elbow" and regain the present river channel through the opening C, above the dam M of the paper mill. In this manner the water privileges of all parties concerned will not be affected, and relief for the suffering inhabitants of the village can readily be found. The conditions necessary in the foregoing project are the formation of an opening not less than about forty feet wide in the high embankment over the old channel BD; the construction of a secure dam across the former middle channel at D; the maintenance of the water surface at a fixed low-water level at B by means of an artificial crest or submerged dam across the present river channel; and the similar maintenance of a constant low-water surface at C by a submerged weir built between the present abutments of the bridge at C, so as to render the water surface in the former channels independent of the fluctuations due to the drawing down and refilling of the pool above the paper mill dam M. By the execution of this plan, it will be seen that any preëxisting necessity for action in that section of the railroad embankment between the dams K and L of the powder company, as the latter are now constructed, may be removed.

It may also be remarked that a considerable amount of other work must be performed in clearing away bars and other obstructions from the former channels, and in removing the dense growth of aquatic plants which has accumulated during the past twenty-five or thirty

years, so as to afford a free flow for the water, but as this work is clearly the duty of the several riparian owners, and can readily be enforced by the local board of health, it is unnecessary to recount these details here.

The suggestion has also been made that a certain amount of water should be delivered through a pipe into the head of the "elbow" from the ponds above the dam L or K of the powder company. I regard this proposition as entirely inadequate to afford practical relief, since the volume of water required to induce proper motion in the former channels is vastly greater than a pipe of even twenty inches diameter would deliver under a head of ten feet and a length of four hundred feet. Such a pipe would discharge about 1,300 cubic feet per minute, which would cause in only *one* channel, forty feet wide and two feet deep, a current of less than one-fifth mile per hour, but which would, on the other hand, represent about twenty horse-power, is discharged through a good turbine under the same head. This volume of water, which would not suffice to create sufficient motion in the various old channels, is thus seen to have a large commercial value under the existing conditions; and hence any such expedient, even if obtained gratuitously, can only be regarded as an auxiliary to some more effective plan.

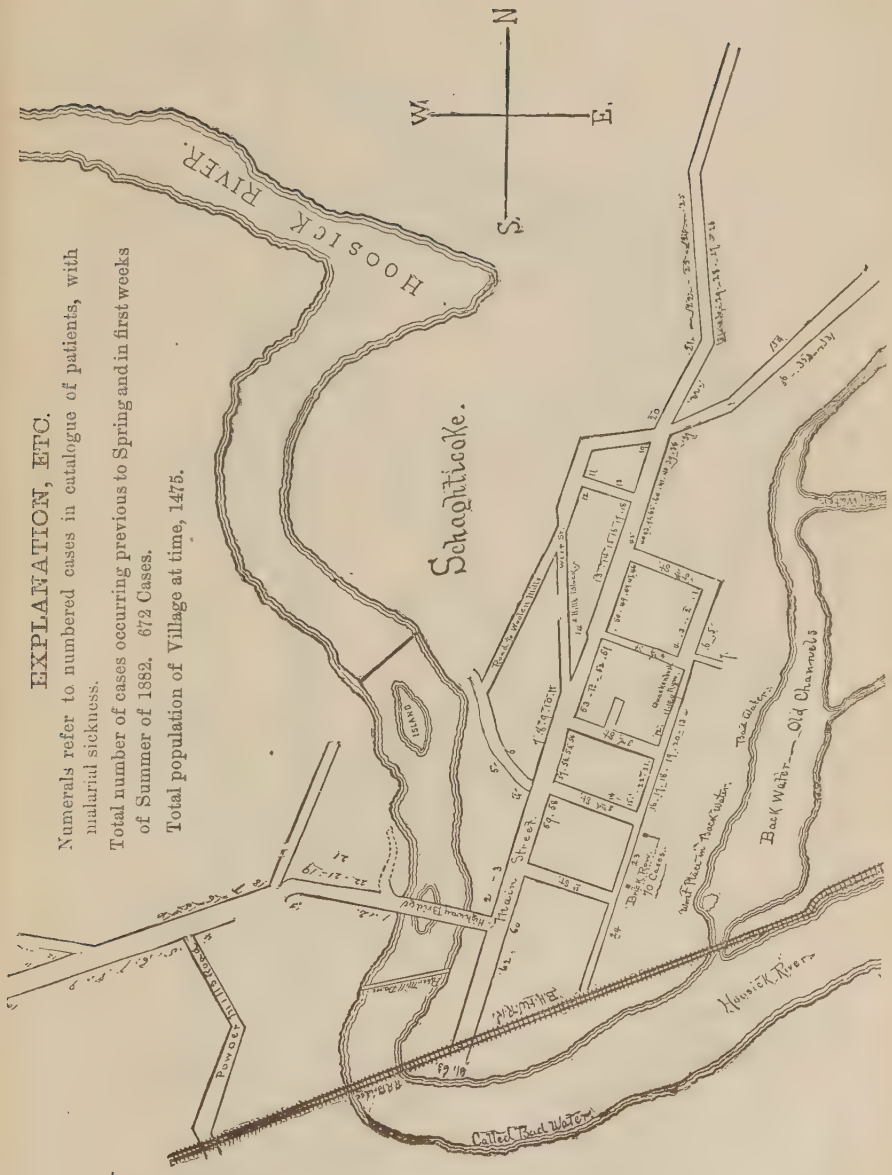
With respect to the cost of executing the two different plans submitted, it is my opinion, that the first will prove much cheaper than the second, and that it will, therefore, be more advantageous for the railroad company to build a small tunnel or culvert, than to cut through their high embankment and construct the necessary abutments, bridge, dams and weirs involved in the second plan, provided that the question of water privilege before mentioned can be satisfactorily arranged. I would accordingly recommend, that if executive orders be issued based upon the *second* plan for securing relief, the parties affected by such orders be permitted to offer to the State Board of Health, within a reasonable period of time, an alternative plan for *drainage*, accompanied with proofs that all obstacles to the carrying into effect of such drainage have been removed; such alternative plan to be equivalent in its effects and results to the executive orders, which may rapidly be framed so as to admit thereof and to refer the ultimate decision as to the mode of execution to your Board.

Respectfully submitted,

EMIL KUICHLING,
Civil Engineer.

ROCHESTER, *September* 9, 1882.

The result.—The first conclusions of the Board and the accumulated information in three successive years have resulted in a satisfactory agreement and acceptable specifications of work which the railroad corporation undertakes on its part to execute, and which the proprietor of the flatlands as well as the owners of the hydraulic franchises have accepted and undertaken to aid in view of the general result sought by the introduction and regulated discharge of an abundant flow of water that shall be introduced from the river at the eastern extremity of the existing chain of pools, all the parties concerned in giving effect to this much desired work have agreed that the inlet from the



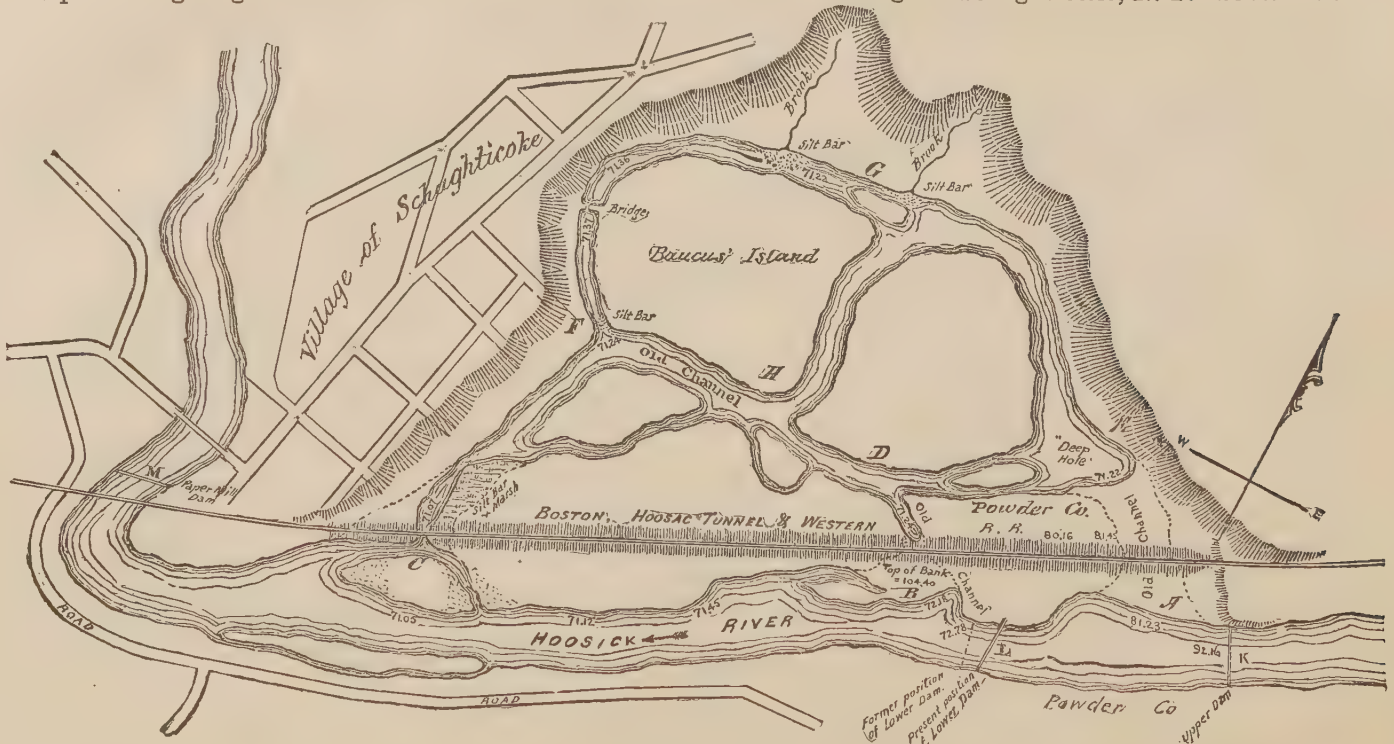
EXPLANATION, ETC.

Numerals refer to numbered cases in catalogue of patients, with malarial sickness.

Total number of cases occurring previous to Spring and in first weeks of Summer of 1882. 672 Cases.

Total population of Village at time, 1475.

Map Showing Stagnant-Water Channels of the Hoosic River at the Village of Schaghticoke, N. Y. Sept. 9 1882.



river shall be made at a point sufficiently far eastward to give five and a half feet head for the inlet which will extend one hundred and thirty feet beneath the embankment; thus the recommendations made in the Board's final report as well as in conclusion second of its first report, are to be carried into full effect; and the inlet from the river is to command greater advantages than were in the last engineer's report, dated September 9, 1882. This increased advantage is by concessions made for the public welfare by the owners of the hydraulic franchise at the place of the artificial inlet.

(*b*) *Obstructions in the Hudson river at the village of Fort Edward.*—Another instance of obstruction in river channels is seen in the Hudson river at Fort Edward, in Washington county, where vast accumulations of saw-dust, are thrown into the current from numerous saw-mills above the village. These huge deposits of organic matter have gradually begun to decay, particularly in times of drought, and continue to emit intensely disagreeable odors and gases, for which reason they should be removed as a nuisance, and through which they are probably detrimental to the public health. In this case the necessity of providing carefully framed laws relating to the preservation of the purity of our public waters becomes apparent, and the attention of all who are interested in the welfare of this great Commonwealth is herewith directed to the devising of such general enactment as will protect and promote the public interests, and, at the same time, interfere as little as possible with the prosecution of private industries, or the constitutional privileges of every individual. The nature of the complaints preferred by the citizens of Fort Edward, together with an account of the present condition of the river at the village and a plan for securing relief, may readily be gathered from the series of documents presented elsewhere in this report.

(*c, d and e*) *Obstructions of ditches and streams in the towns of Schodack and Oneida Castle, and in the town of Perrinton, Monroe county.*—Among the numerous other complaints of malaria caused by obstructions in water-courses, and which have been investigated by the committee on drainage, sewerage and topography, the cases submitted by the health authorities of the villages of Schodack, in Rensselaer county, and Oneida Castle, in Oneida county, and of the town of Perrinton, in Monroe county, may prove of interest, as they can be selected as representatives of many similar cases where public nuisances on a comparatively small scale have been created and maintained by the negligence of powerful railroad corporations, and where direct methods of securing the abatement of such nuisances do not appear to be available or made use of by the local boards of health of small communities.

During the construction or improvement of any important line of railway, the subject of drainage usually receives very subordinate attention from the engineers, and the matter is generally left for adjustment until after the road is completed, when the engineers will have more time to properly study the various problems. The officers of the corporations, however, then commonly reduce expenses by dismissing most of the engineering employees who, from a residence in the locality, have become familiar with certain omitted drainage problems; and in the multiplicity of duties imposed upon those who may be retained, it is not surprising that many of the lesser cases become forgotten

altogether, and are recalled to mind only after long-continued neglect has developed them into really dangerous nuisances. Upon presentation of complaint by the local authorities, the subject generally receives little attention from the company, and the evil is either only temporized with, or else remains untouched until it reaches more formidable proportions, when the patience of the community is exhausted and an appeal for aid and protection is made to the Governor. Such is commonly the history of those cases from which the particular instances here referred to have been selected as illustrations. The following papers are sufficient in each case to explain the difficulty and the corresponding simple remedy:

To His Excellency ALONZO B. CORNELL, *Governor of New York:*

The undersigned residents in the town of Schodack, in a district about one mile south of the village of Castleton, respectfully represent to you that their families are now suffering and have for a few years past been suffering from miasmatic sickness, caused by obstructions to the natural drainage of a small district which lies between the upland and an embankment upon which the Hudson River railroad is built, and having appealed in vain to the town authorities to take proceedings for the abatement of this evil, now respectfully petition you to require the State Board of Health to investigate these causes of suffering, and to report the same to you for such action as shall be justifiable under the law.

And your petitioners will ever pray.

(Signed) B. CLAPPER, ALFRED VAN WORMER,
J. D. SMITH, JOHN P. GROAT,
CHAS. H. SMITH, WM. PALMATEER,
STEPHEN CALLANAN, J. L. COONLEY,
J. E. COLLINS, PETER COONLEY.

SCHODACK, *November* 25, 1882.

Careful examination of the locality was made in company with an engineer, who reported as follows:

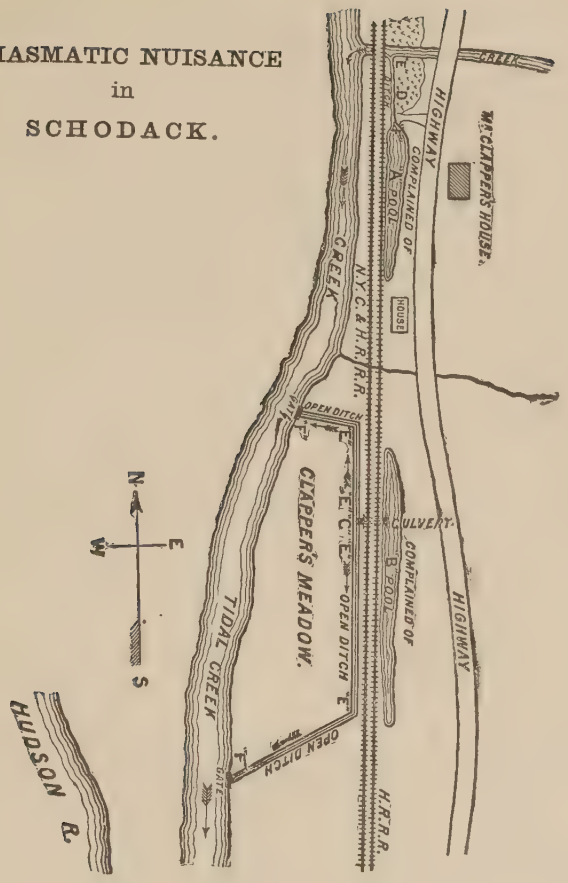
ALBANY, *November* 29, 1882.

To State Board of Health:

Agreeably to your request, and in company with yourself, I visited the locality complained of by Messrs. Clapper, Smith *et al.* at Schodack, one mile south of the village of Castleton, and append an explanatory sketch of the territory inspected, showing the topographical features of the drainage, and suggestions as to the remedy of the existing evils.

The pool marked "*A*" is immediately in front of Mr. Clapper's residence. It was originally an arm of the large creek shown west of the present railroad embankment, and the portion shown *blue* was isolated and left unprovided for, as regards the maintenance of a proper circulation, by means of the construction of this embankment and the neglect to maintain a proper open ditch to carry off the water. An open ditch was constructed by the railroad authorities, at one time, to facilitate an occasional flushing of this pool, at the period of high

MIASMATIC NUISANCE
in
SCHODACK.



"A". Pool undrained (ditch closed).

"B". Pool undrained (Culvert filled up at west side and closed).

"C" Culvert (needs lowering and extending westward to open ditch).

"D". Ditches from "E" to "F" needs opening.

tides, and to permit the water therein to escape at the ebb; this ditch is now closed, and at low tide, and for a long season, this pool has remained without an outlet. The ditch marked "D" extending from "E" to "F," should be opened and the pool filled up to a grade that will necessitate the flow of all the water through the ditch so opened to the creek at "D." The pool marked "B" was caused by the excavation of the earth at this point for the original construction of the railroad embankment. A culvert was placed, as shown at "C," to permit some of the water to escape to the open ditches on the west side of the railroad embankment. The embankment was subsequently widened, without extending the culvert. Rubble stone and cobble stones were thrown in, over which the earth filling was placed, and the culvert is now of little service. The culvert should be taken up, lowered and reconstructed. It should be extended to the open ditch shown at "C." The ditches, as shown, should be dug to such a depth as will permit the efflux of the water in the pool "B" at low tide, and proper gates should be maintained at the termini of the open ditches at the creek.

Respectfully submitted,

(Signed) WILLIAM S. EGERTON,
Civil Engineer.

STATE BOARD OF HEALTH OF NEW YORK,
December 5, 1882.

The following return was then made to the Governor:

His Excellency ALONZO B. CORNELL, *Governor of New York:*

SIR — The State Board of Health has ordered the annexed return to be made to you concerning the alleged nuisance in the town of Schodack, and situated a mile and upwards south of the village of Castleton.

The merits of the petition and complaint made by ten well-known citizens of Schodack, and which you referred to this Board for investigation, have been found worthy of the urgent request made by the complainants.

A committee of this Board, accompanied by a civil engineer, inspected the premises which were described to you in the petition, and the paper marked "A" is a brief and exact description of the nature and causes of the nuisance. The engineer's map attached to his report completes the explanation upon which this Board respectfully submits to you its conclusions thereon as follows:

Two natural water-courses which had their outfall into a creek or arm of the Hudson river, opposite the old "Beekman farm" and along its western front, have been cut off and obstructed, by an extensive embankment built by and for the Hudson River railroad. The northern water-course and outfall is obstructed by a transverse causeway or embankment, nearly opposite the present residence of Mr. B. Clapper, one of the complainants, and the pond or pool there caused and existing is undoubtedly a source of miasmatic fever from which Mr. Clapper's family suffers every summer and autumn. It is the pond marked "A," and as it admits of complete drainage by partial and

graded filling in of its southern section, it should be so treated as to be drained off northward to and through the culvert bridge of the creek marked "D." The water-course to the southward of the old Beekman mansion being obstructed through its entire length against outflowing toward and into the Hudson river, and the culvert which was originally constructed opposite to the deepest portion of said water-course, which is now a stagnant pool, marked "B," on the engineer's map, and being like the pool marked "A," wholly upon and constituting part of the property of the New York Central and Hudson River railroad, should be made to connect with the Hudson river through its tidal creek at the south-west, by means of a culvert suitably enlarged and deepened at the place where the culvert once existed, and upon the engineer's map duly indicated at "C."

Ditches suitably constructed should be opened where they were some years ago made, marked upon the engineer's map, hereto annexed, as open ditches, extending to the two tide-gates, marked on the border of the creek by the word "gate." As the present beds of the two pools or stagnant ponds here mentioned were deepened by excavations for building up the embankment upon which the railroad was constructed, and as the entire area now covered by these stagnant ponds is the property of the railroad company, and cannot, by the complainants or other private citizens, be remedied or prevented, the said corporation is wholly responsible for their presence and continuance.

The conditions and evils herein described are unquestionably the causes of much sickness; and the pools and obstructed drainage, as described in the report and map of Engineer Egerton, herewith submitted, are nuisances, dangerous to life and detrimental to health, and therefore the aforesaid corporation should, without delay, remedy the said evils and prevent them in the manner specified in the report of the engineer, as here annexed.

Respectfully submitted,

[L. S.]

E. M. MOORE, *President.*
ELISHA HARRIS, *Secretary.*

OBSTRUCTION AND NUISANCE IN ONEIDA CREEK.

A nuisance caused by the obstruction of Oneida creek was referred to, and investigated by, the committee.

The following report of the engineer was received:

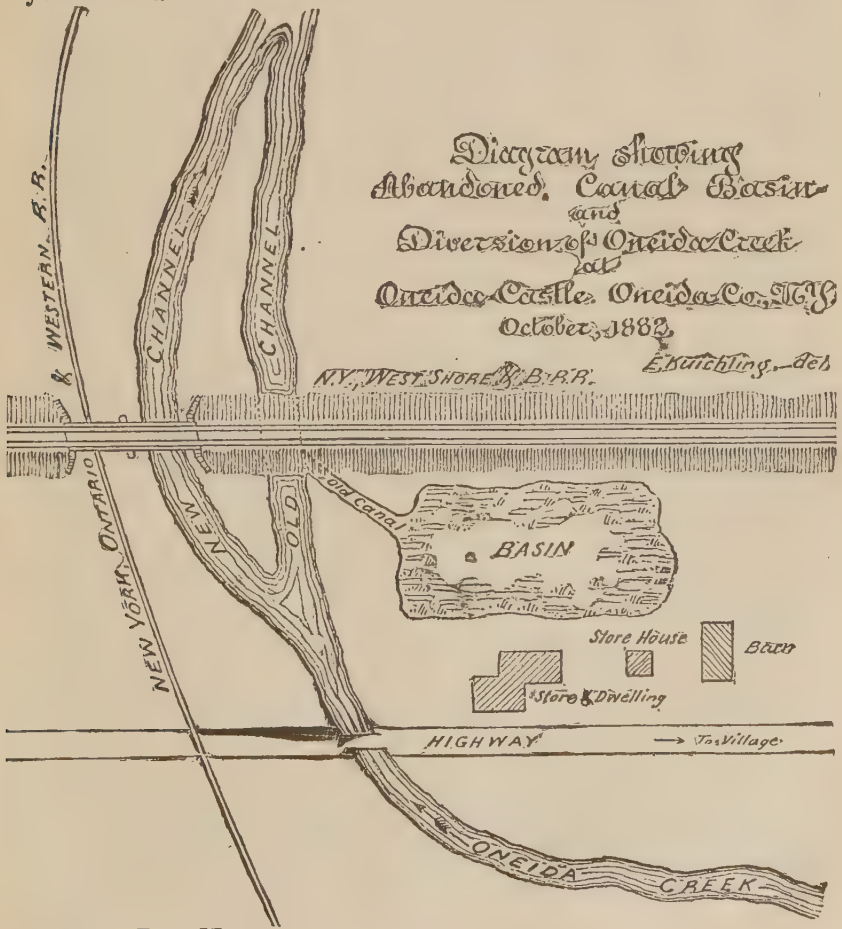
ROCHESTER, N. Y., *December* 1, 1882.

To the State Board of Health:

The undersigned begs leave to submit to you herewith the following results of his examinations, made by request of your Board on October 7, 1882,

On the diversion and obstruction of Oneida creek at the village of Oneida Castle, Oneida county, N. Y.— A few miles south of the village of Oneida is situated the small village of Oneida Castle, which was formerly the upper terminus of the Oneida Lake Navigation Company's system of canals, and where a relatively large artificial basin for the storage and loading of the flat-boats had been excavated in the

lowlands adjoining Oneida creek. All of the privileges, easements and water-channels of the said navigation company, however, were afterward acquired by the State for canal purposes, and a portion of the system of canals built by said company is still used as a feeder for the Erie canal, while the remainder was gradually abandoned. In this latter portion, the old terminal basin referred to appears to have been included. From long neglect it has lost much of its original character, and its banks are now thickly overgrown with small trees, bushes and weeds. The short section of old canal which formerly connected it with the Oneida creek served both to drain the excavation when the stream was low, as well as to admit some of the water therefrom in times of flood. The basin, nevertheless, remained until recently in a condition that appeared to be satisfactory to the adjoining residents and land-owners, since no complaints about it were made. During the past summer, however, the excavation contained much stagnant water, from which offensive odors and malaria were emitted, thereby rendering it a public nuisance, and bringing it to the notice of your Board.



An examination of the locality on October 7, 1882, in company with Dr. H. W. Carpenter, the president of the board of trustees of Oneida, who took a most commendable interest in the matter, showed that the basin contained stagnant water to a depth of two or three feet, and was filled with reeds, rushes and several varieties of algae, some of the latter entirely covering the surface of the water in places and imparting to it a bright red, blue and green color. The decomposition of these aquatic plants during the heat of the summer was obviously the source of the disagreeable odor mentioned; and this fact, together with the presence of a considerable area of stagnant water, has made the complaint well founded.

The cause of the whole difficulty is the construction of a high and solid earthen embankment for the New York, West Shore and Buffalo railroad, directly across the old channel of the Oneida creek, immediately north of the basin, and the diversion of the creek into a new channel excavated somewhat westerly of the original one, but not as deep. In consequence of this action on the part of the railroad company, the mouth of the old canal leading from the basin to the original creek has been partially filled up by the earth of the embankment, as indicated upon the accompanying diagram; and as the new artificial channel of the creek has not been excavated to a depth sufficient to drain the basin, the water sets back into the latter either directly during floods, or by percolation when the stream has regained its usual state.

The object of this alteration of the creek channel was obviously to save to the railroad company the cost of an additional abutment for a bridge, since the alignment and grade of the new railway rendered it necessary to cross at a considerable elevation over the tracks of the New York, Ontario and Western railroad, which at this point runs northerly and near to the west bank of the creek. Accordingly, as the alteration was made by and for the interest of the said N. Y., W. S. & B. R. R. Co., and as the work was left by them in such condition as to cause a public nuisance upon the basin (which I am informed still remains the property of the State), by reason of insufficient depth for the new channel and the obstruction of the mouth of the old canal, it would appear that said company should deepen the new creek channel and remove the earthen obstruction from the outlet of the basin, so as to prevent the water of the creek in its ordinary low stages from setting back into the basin and also to permit drainage and flood waters to escape properly therefrom. Measures should also be taken by said company to prevent the water in the two portions of the original creek channel, north and south of the embankment, from becoming stagnant and thus creating further nuisance.

The details of the work to be performed in order to effect the abatement of the evil and the improvements specified in the foregoing are quite simple; but as the railroad company's engineers may know of valid reasons for preferring to drain the basin by constructing a small culvert under the present embankment, instead of by deepening the new creek channel, or to abate the nuisance by filling up the basin with fresh earth and then properly grading the same, the manner of securing relief may fairly be submitted by them to your board for approval. The refilling of the basin and old canal is doubtless the cheapest mode of procedure, and if properly done, the nuisance due to

the basin alone will be effectually remedied; but there still remains the care of the two stagnant pools in the old channel on each side of the embankment, which have not yet given rise to complaint, but which will soon make their presence felt unless the stagnation of the water therein is prevented.

Respectfully submitted,

EMIL KUICHLING, C. E.

In relation to the alleged nuisances which have been brought to the official notice of the Board in the town of Perrinton, Monroe county, N. Y., and near the village of Fairport, the engineer, who was directed about the beginning of this month to examine into said matter, submits the following report: *

The accompanying documents were transmitted to me from Dr. E. Harris, Secretary of the State Board of Health, and consist of the following:

1st. A letter marked (A), from Anson L. Beardsley of Fairport, to Jesse B. Hannan, supervisor of the town of Perrinton, dated July 27, 1881, describing certain nuisances adjacent to the line of the N. Y. C. & H. R. R. R., and appealing to said supervisor to cause said nuisances to be abated.

2d. A memorial or petition marked (B), from forty-five inhabitants of the town of Perrinton, to Governor Cornell, requesting him to direct the State Board of Health to examine the nuisances in said town which are caused by the N. Y. C. & H. R. R. R. Co. upon and adjacent to their property. This petition was referred by the Governor on February 16, 1882, to the State Board of Health.

3d. A letter marked (C), from Jesse B. Hannan to Dr. E. Harris, referring to said nuisances and to certain improvements contemplated to be made by the N. Y. C. & H. R. R. R. Co. in the locality in question, and inclosing:

4th. An outline or sketch of said locality, marked (D), indicating the position of the alleged nuisances.

5th. A letter marked (E), from Prof. James T. Gardiner to Dr. E. Harris, recommending that the undersigned be directed to examine said nuisances and report upon the facts.

In accordance with the directions received, I notified the board of health of the town of Perrinton that I would be at their service in Fairport on March 8, 1882, but upon my arrival I found them unprepared to accompany me to the locality of which complaint had been made. The investigation was, therefore, postponed until the 15th inst., when the undersigned, in company with Messrs. Hannan, Murdoff, Briggs and Ramsdell, of the board of health, and Messrs. Beardsley, Titus and others, made as thorough an examination of the matter as circumstances permitted.

The complaints are, that the N. Y. C. & H. R. R. R. Co. has, by means of certain embankments upon the lands owned by it, obstructed certain ditches and natural water-courses in the town of Perrinton, in consequence of which the natural drainage has been ren-

* Papers not printed. The titles and references explain the objects of investigation and the engineer's relations to this Board's duties under section 10, chap. 322 of the Laws of 1880.

dered seriously defective, and wet lands created upon adjacent property, to such extent as to become detrimental to the public health.

Map showing a portion of the Town of Perrinton, Monroe Co., N. Y.

The locality alleged to have been injured by said obstructions was pointed out to me and defined as a comparatively narrow strip of land on each side of the tracks of said railroad company, and extending from a structure called Howard's bridge to a point about one and one-half miles easterly therefrom, as shown upon the appended diagram. In this area, which is quite flat from the banks of the Erie canal for a considerable distance to the north, there are seen several patches of wet or marshy land, one of them of considerable magnitude, besides occasional broad and shallow ditches upon the lands of the railroad company. The natural drainage of this territory is in a westerly direction through a stream called Thomas creek, which in turn discharges into Irondequoit creek, and thence into Irondequoit bay. Across this stretch of low ground the tracks of said railway are carried upon a continuous or solid earthen embankment, beginning at Howard's bridge and extending several miles easterly through the town of Perrinton, in Monroe county, into the adjacent town of Macedon, in Wayne county. About one mile west of the line between the said two counties there appears to be a slight ridge or summit in the low ground; and near this summit a small rivulet named Downer's brook, flows down in a south-westerly direction from a spring situated upon more elevated land, and causes a considerable area to become swampy. In the low ground there is apparently no well-defined channel for the waters of Downer's brook, which seem to be disbursed over this area, and which, from the statements made to me, have always heretofore rendered it wet; but, judging from the natural slope of the

land, the brook probably finds its way into Thomas creek, as indicated by the dotted lines upon the appended sketch. No evidence was offered that the original course of the brook had been altered or obstructed in any manner by the railway company, or that the area of present swampy land at this point had ever been drained in a systematic way. The latter remark is also applicable to the other patches of marsh to which reference has already been made.

In the construction of the railway embankment, the company purchased narrow strips of land upon each side of their line, removed the earth in many places from said strips to the depth of a few feet and deposited it as embankment between the excavations. The latter being formed in flat territory originally defective with regard to drainage quickly became filled with water which the railway authorities endeavored to remove by grading the excavations or "borrow-pits" and forming ditches, so as to obtain an outfall for this water into Thomas creek at a point about one and four-tenths miles westerly of the summit. A series of levels made by me shows, however, that this grading of the ditches and borrow-pits has either been done imperfectly, or else that these artificial channels have become gradually obstructed in the course of time by the natural action of the elements. In consequence of this, a number of long and narrow pools of water are left standing in the excavations on each side of the embankment during the summer, and as no opportunity is afforded to this water to flow away, it becomes stagnant and gives rise to the growth of aquatic plants whose decay causes the malaria complained of.

These pools extend, with occasional interruptions, along each side of the embankment from the summit aforesaid to Howard's bridge, a distance of about one and four-tenths miles, in which there is a fall of from five and one-half feet to six feet. This declivity is ample to afford effective removal of the water now left standing in the excavations; and with a trifling expense, the artificial channels can be trimmed and graded in a satisfactory manner. To a request of this kind the railway company will doubtless render prompt compliance, and thereby abate the nuisance now existing upon their lands. Such work on the part of the railroad will, however, not procure very material relief for those lands which have for years past been wet and marshy; but its execution and subsequent maintenance will insure the ordinary surface drainage an efficient discharge.

In order to render the wet lands adjacent to the railway fit for profitable cultivation, it will be necessary either to deepen considerably the ditches on each side of the embankment, or else to deepen and regulate the channel of Thomas creek from the summit westerly to the village of Fairport for a distance of about two miles, in which a fall of ten or twelve feet can readily be obtained. This would, however, entail a large expense, and it is not clear from the evidence furnished me what part thereof should be borne by the company or the land-owners. In the determination of this question of the improvement of said lands by systematic drainage, a far more exhaustive examination than that which I have been directed to make will be required before the proportion of the whole expense of such improvement that the respective parties should bear can be rationally determined; and hence, before proceeding further in this matter, I will await your instructions.

With regard to the contemplated improvements on the part of the railway company to which reference was made in Supervisor Hannan's letter, marked C, to Dr. E. Harris, I would remark that Mr. Wm. Lush, resident engineer of the N. Y. C. & H. R. R. R., informed me that they would consist merely of a reduction of the grade of the railway in the vicinity of Fairport, and not in any change of the alignment.

From Dr. C. M. Briggs, health officer of the town of Perrinton, I received to-day the inclosed medical statistics relating to the district under consideration.*

Trusting that in this report I have submitted to you the facts which you desired to learn, I have the honor to be

Respectfully yours,

EMIL KUICHLING,
Civil Engineer.

Mill-pond at Spencerport.— Another frequent source of complaint of malaria investigated by the committee is the fluctuation of the water surface and exposure of mud margins of mill- pondsin various localities throughout the State. As an example of this kind, we may refer to the allegations presented by the citizens of the village of Spencerport, in Monroe county, and also to the following report submitted to the committee :

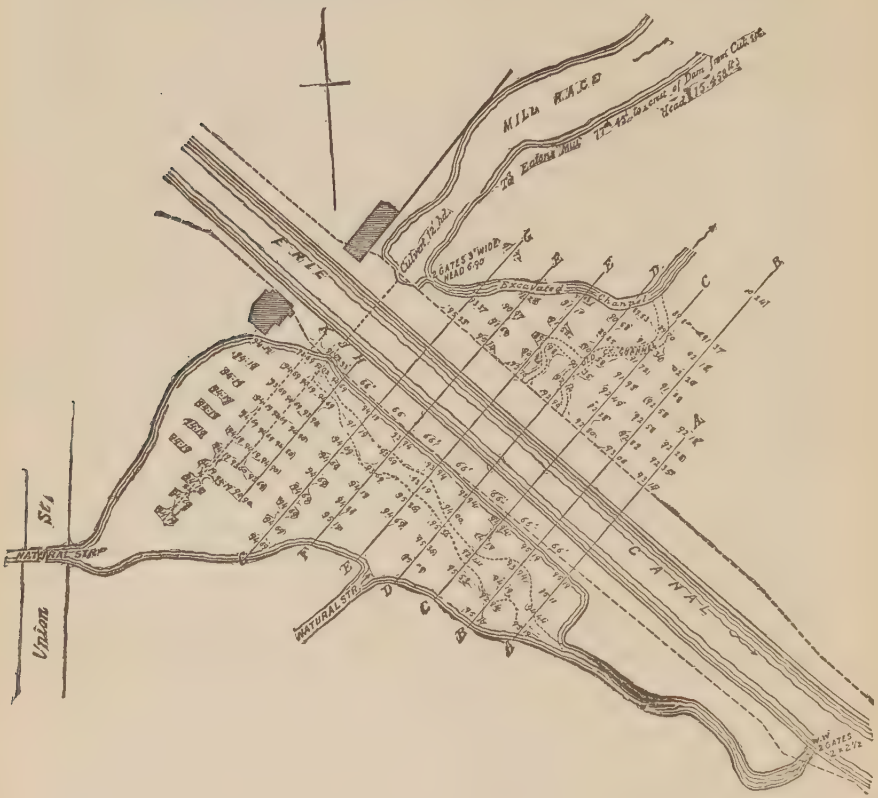
"In the village of Spencerport, in the town of Ogden, and county of Monroe, the nuisance referred to in the inclosed memorial from the inhabitants consists of a large and quite shallow mill-pond, situated immediately south of the Erie canal embankment, and east of the principal business street of the village, as indicated upon the appended diagram. This pond lies in a small valley extending in a northerly

* See subsequent chapter on Prevalent Diseases. Fairport.

direction through the territory under consideration, and has, when full, an area of about four acres. The Erie canal crosses the valley upon an embankment of considerable height, and ample provision for the drainage coming from the south is afforded by a large stone culvert under the canal, the bottom of this culvert being about six and one-half feet below the water surface of the pond. To the north of the canal the valley has a considerable declivity, as the bed of the original water-course at the foot of the slope of the towing-path bank is about ten feet below the surface of said pond, and fifteen feet below at the mill-dam, which is located about one-quarter of a mile further north. The culvert under the canal appears to be located somewhat westerly of the original channel of the stream draining the valley, and close to the rather abrupt western bank, thereby facilitating the construction of the flume or race in which the water is conveyed to the mill. From the south and south-west, two small rivulets or natural water-courses empty into the pond, while from the east, the pond receives the discharge of the surplus water in the canal over a waste-weir only four feet wide. This waste-weir is also provided at the bottom with two wooden slide-gates, two feet wide and two and one-half feet high, through which there is considerable leakage. In consequence of the shallowness of the pond, the greater portion of its area is covered with a dense growth of aquatic plants, so that it resembles a stagnant swamp rather than a well-kept storage reservoir for the water required by the mill; and furthermore, when the pond is full the water sets back in the two small rivulets mentioned above, thereby causing the saturation and partial overflow of two adjacent areas of lowland, so that the aggregate swamp area can fairly be estimated at about six acres.

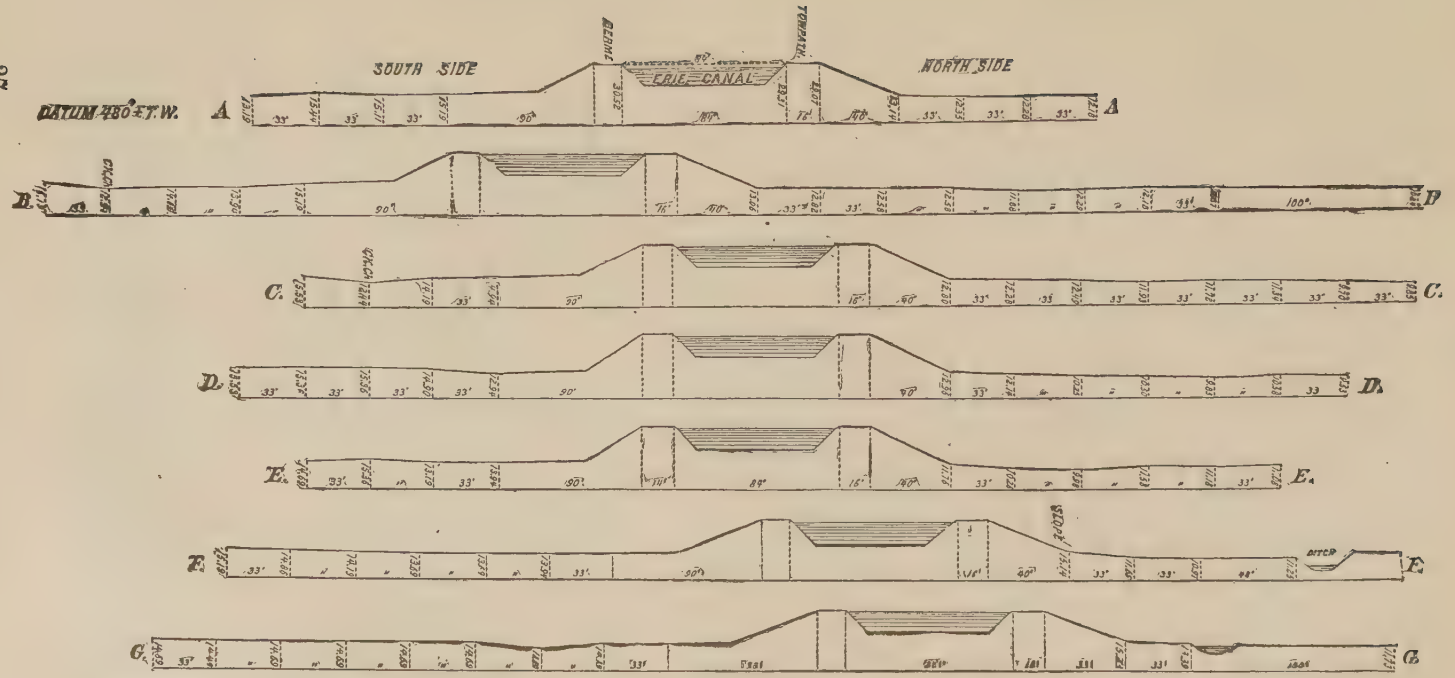
The flouring mill, which derives its water power from this pond, is at the present time the property of Mr. Joseph Eaton, of Spencerport, and is provided with four runs of stone, driven by a single turbine wheel thirty inches in diameter, working under fifteen feet head, and requiring, when running at its full capacity, about 1,300 cubic feet of water per minute. But on the 17th inst., when the undersigned examined the locality, the two natural water-courses were delivering into the pond only about twenty-five or thirty cubic feet of water per minute, while a very large volume of water was escaping from the waste-weir and supplying the pond, even though the surface of the canal was not within two or three inches of the high-water mark. As the natural drainage of the valley to the south does not appear to be sufficient to furnish an adequate supply of water to run the mill profitably, except during freshets or heavy rain, it is evident that the mill must depend for its water almost exclusively upon the overflow and leakage from the canal waste-weir; and when the supply from this source is not equal to the demand, it is allowed to accumulate in the pond until it becomes full, whereupon the machinery is set in motion and the pond drawn down until its storage capacity has been exhausted, after which it is again filled and the same process of drawing down is repeated. In this manner a large area of swamp mud is periodically exposed to the sun and atmosphere during seasons of drought; and when it is remembered that the lowering of the water surface in the pond to the extent of only one foot below high-water mark lays bare about three acres of

Map of Millpond at Spencerport, and of land opposite, North.



The numerals show elevations of pond-bottom and of ground-surface.—Datum = 400 ft. + above Tide-level.

A——A
B——B } etc. Levels, shown here, and in cross-sections on next page.
C——C



Cross-sections showing **LEVELS** of bottom of Millpond, Spencerport, and of land North and opposite.

the bottom, as stated to me by a number of residents, a fair notion of the unhealthy state of the locality can readily be formed.

From the evidence furnished me, it furthermore appears that the mill privilege in question was established in 1833, or several years after the completion of the original Erie canal, and that a large spillway from said canal had been constructed near the site of the present waste-weir; but no evidence or record of any contract or agreement on the part of the canal authorities to supply any definite amount of water to the owner of the mill privilege was presented, or can be found in the canal engineer's office in this city. I am, therefore, led to the conclusion, that if the overflow and leakage from the existing waste-weir were stopped, the water-power of the mill would practically cease except during freshets and times of heavy rain-fall; and also that the true solution of the difficulty lies in the total obliteration of this water privilege and the restoration of the original water-courses or its equivalent. As the present culvert is amply adequate, both in dimensions and depth, to discharge the surface drainage coming from the south, together with such water as may find its way through the present waste-weir from the canal, the destruction of the water-power of the mill will quickly cause the obnoxious pond to disappear, and will enable the owners of the swampy land to convert it, with little expense, into rich and wholesome soil. It should be remarked, also, that another plan for abating the nuisance was fully discussed and considered before arriving at the above conclusion. This plan involves the excavation of wide and deep trenches or channels through the swampy area, and the depositing of the mud and muck thus excavated upon the adjacent bottom, thereby raising the latter a little above the water surface, and preserving the mill privilege. I am, however, of the opinion that such a proceeding would not only be injurious to the health of the residents on account of the malaria which would ensue from the exposure of a large amount of this swamp mud to the air, but that it would also soon prove unsatisfactory to all parties on account of the greater expense, as the whole swampy area would require a thick coating of fresh, clayey earth to check and prevent the exhalations from the decomposition of the organic matter contained in the mud. Suitable material for such an artificial elevation of the present surface of the swamp is not here within convenient reach; and, therefore, it appears to me that the most feasible expedient for abating the nuisance will be to purchase the water-privilege from the owner and then to destroy it. The cost of this plan I have not been able to determine satisfactorily, since the value of the mill-privilege is entirely dependent upon the production of a contract or agreement on the part of the State to furnish a definite amount of water for power from the Erie canal.

Respectfully submitted,

EMIL KUICHLING,

Civil Engineer.

The question of the proper maintenance of such mill-ponds is a large and growing one, since many of these reservoirs of water-power, which were originally deep and salubrious, have gradually become silted up by the deposit of earthy matter carried down by freshets in

the streams; and as the water became shallow, it afforded opportunity for the growth of algae, whose decay in the summer gives rise to extremely offensive odors. Many of the small streams which furnish water-power have furthermore become defiled by sewage from various sources above the ponds or reservoirs, and thus the latter are frequently merely settling tanks for contaminated water. The presence of such comparatively large business of diluted sewage in the midst of a community cannot fail to become sources of disease, and the improvement of their sanitary condition is strongly urged upon all health officers.

*Final results at Spencerport.**—The Assembly of the State having directed this Board by resolution to examine into the nature and causes of the alleged nuisance in Spencerport, the Board directed Engineer Kuichling to proceed with such preliminary surveys as would enable it to take and use the testimony of the inhabitants in relation to this subject. The diagrams upon pages here following illustrate the result of the survey thus ordered and the subject-matter of the annexed report. The village board and public-spirited citizens promised to follow up these conclusions to their legitimate results.

STATE BOARD OF HEALTH,
March 5, 1883.

CONCLUSIONS AND RECOMMENDATIONS TRANSMITTED TO THE SUPERINTENDENT OF PUBLIC WORKS IN ACCORDANCE WITH THE RESOLUTION OF THE LEGISLATURE, DATED FEBRUARY 21, 1883.

1. That the mill-pond is a nuisance, dangerous to life and detrimental to health, owing to the fluctuation of the water surface and consequent exposure of mud margins of great breadth, resulting from the nearly level bottom of said pond; but we find none of this upon land belonging to the State.

2. The mill privilege has come to depend for its water supply chiefly upon the leakage through and over the existing waste-gate on the canal at the point indicated on the maps.

3. And that the responsibility of the State consists in thus contributing essentially to the maintenance of the nuisance.

4. There is no evidence whatever of any obligation on the part of the State to contribute in any manner to the maintenance of the mill privilege, and the canal has no other lawful and necessary relation to sustain to said mill privilege, except to keep open the culvert by which the stream flowing from the southward shall have free outflow to the northward of the canal.

5. It, therefore, follows that it is the duty of the State to cease its contribution to the nuisance by either removing the existing struc-

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*The Board received the following order from the Legislature on the 21st of February, 1883:

Resolved, That the State Board of Health be, and are hereby, requested, to examine the pond of water on the south side of the Erie canal at Spencerport, Monroe county, claimed to be a nuisance created by water from the canal; to take such evidence and swear such witnesses as shall be produced before them, and make a report with the evidence taken before them to the State Superintendent of Public Works, within fifteen days from the passage of this resolution.

By order of the Assembly,

(Signed) WALTER H. BUNN, *Clerk.*

tures for waste or overflow to some other point, or by altering it, so that it shall no longer act as a spill-way, although it may be retained as a waste-gate, for use in extraordinary emergencies for canal purposes.

6. If it should be so retained, it becomes absolutely necessary that it should be perfectly water tight, strictly closed and under careful supervision, to prevent any interference therewith.

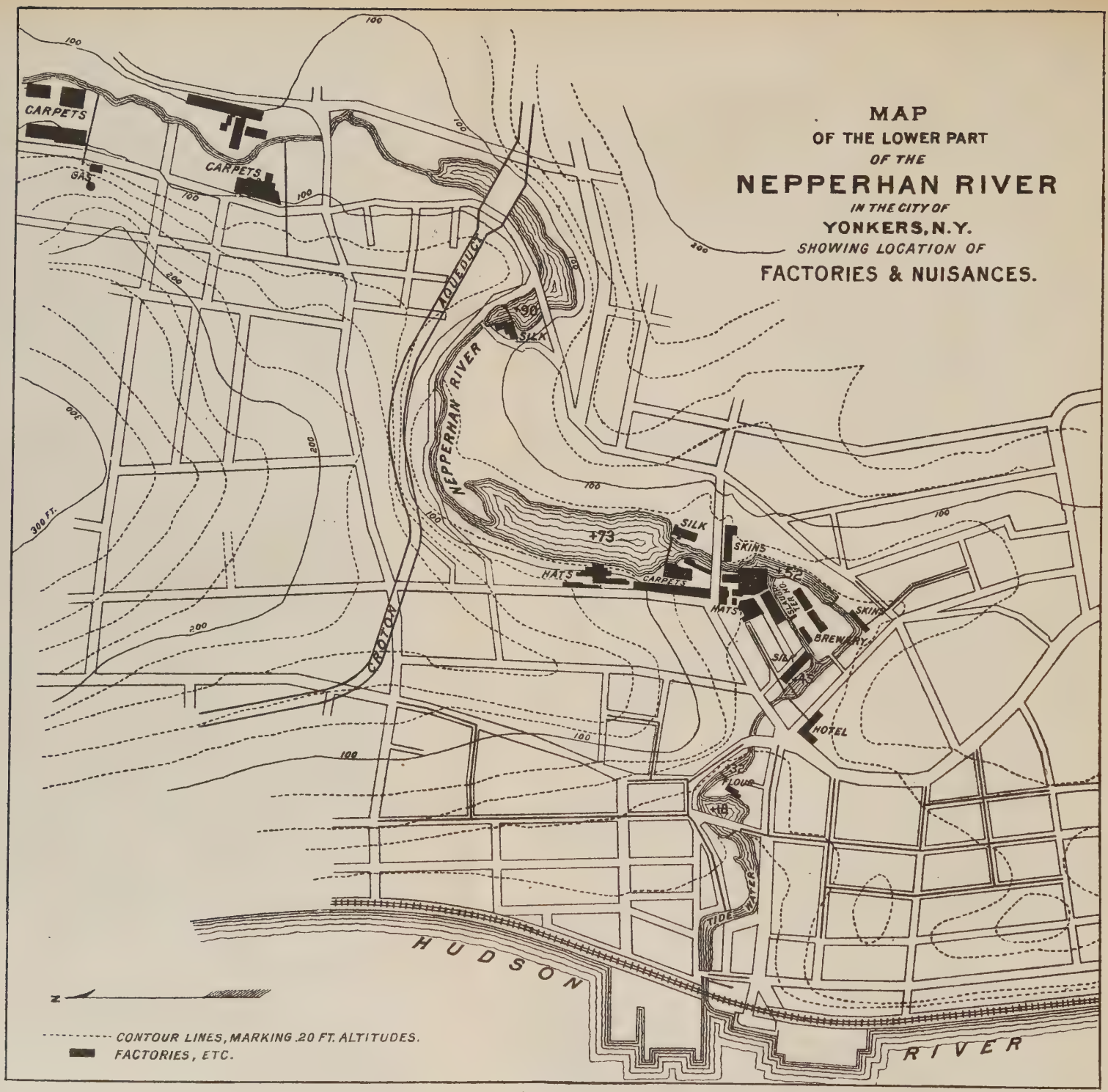
(Signed) JAMES T. GARDINER,
Chairman.
EDWARD M. MOORE,
President,
ERASTUS BROOKS,
JAMES G. HUNT,
ELISHA HARRIS, *Secretary.*

Committee on Drainage, Sewerage and Topography, acting for the State Board of Health, by authority under section 4 of chapter 322 of Laws of 1880, *and as ordered by the Board at special meeting held February* 24, 1883.

III. *Defiled Natural and Artificial Water-Courses and Miasmatic Diseases in Erie, Ontario, Madison, Oneida, Broome, Columbia and Westchester counties.*

The pollution by sewage of the water in canals, streams and lakes has also engaged the attention of the committee in a large number of cases during the past year, and abundant evidence has been collected to convince all who are versed in sanitary science that this subject should receive the most careful attention of the Legislature for the provision of definite laws prohibiting or restricting the disposal of raw sewage into public waters. Reference to some of the cases investigated more thoroughly last year has already been made in the second annual report on pages 24–31, and means of relief by proper legislation were therein amply discussed and recommended, so that any further remarks or suggestions relating to laws now become unnecessary.

(*a*) *Pollution of the Main and Hamburg canal in Buffalo.*— The most important of these cases is the pollution of the Main and Hamburg canal, in the city of Buffalo, by the discharge therein of the raw sewage from a large portion of the city, together with the organic unsalable refuse of several grape, sugar and starch-works. The magnitude of this defilement is enormous, and its pernicious effects have already extended themselves by means of the Erie canal and Tonawanda creek to the village of Tonawanda and the city of Lockport. A large amount of testimony was taken last August at Buffalo, Lockport and Tonawanda by the committee in relation to the character and amount of putrescent organic matter that is daily thrown into the Hamburg and Erie canals at the former place, and the conclusion was reached that a cessation of this method of sewage disposal was absolutely and immediately necessary. The principal difficulty was found to be due to the glutenous refuse of the glucose and starch factories, which was discharged partly in suspension and partly in solution directly into the



THIRD ANNUAL REPORT STATE BOARD OF HEALTH OF N.Y.

canals, and which, by its subsequent decomposition, caused the intolerable odor known throughout the entire vicinity as the "Hamburg smell." Careful chemical investigation, however, revealed that means for retaining the gluten from the liquid wastes of these establishments were both available and practicable, and the proprietors of the said works were accordingly urged to resort to such measures as will insure purification before allowing the liquid wastes to flow into the canals.

It should also be mentioned, that the city of Buffalo has in contemplation the construction of a suitable intercepting sewer along or near to the line of the Hamburg and Erie canals, which will, upon its completion, prevent the entrance of sewage into said canals, except in times of heavy rain-fall, when it will become so diluted as to be practically innocuous.

(*b*) *Nuisance at Yonkers. Investigation of the pollution of the Nepperhan river by mill-wastes and sewage.*— The return which this Board made to the appeals from citizens of Yonkers in the two previous years had certified to the Governor, as well as to the petitioners, that no action would be taken by the State until the city authorities of Yonkers "shall have endeavored to secure obedience to their own sanitary ordinances."* Nevertheless, the board of health in this city, having found it impossible to incite the very authorities that appointed them, and the sewer and improvement commissioners of the city, to take any action whatsoever that would be adequate to the relief and prevention of the Nepperhan nuisances, appealed urgently to his Excellency, Governor Cornell, as shown in the annexed copy of that document, and thereupon the State Board, under the Governor's order and special directions, given August 9, 1882, proceeded to the thorough investigation, with results as here briefly recited.

To Hon. Alonzo B. Cornell, *Governor:*

Sir — The State Board of Health has the honor to return to you its reply to the papers you referred to it from the Board of Health of the city of Yonkers on the 25th of July, and to report to you as follows:

The memorial of the board of health of Yonkers, as addressed to you on the 15th of July, states that the course of the Nepperhan river through that city is obstructed and diverted by dams at various places; that said dams have caused much fermenting organic matter to be deposited in the several ponds within that city, and that deleterious emanations result therefrom.

As requested by that board and directed by you, the State Board of Health has carefully examined the said nuisance and its causes, and will in this communication submit recommendations for the abatement and prevention of the evils here described.

With a population now exceeding 20,000, with a long extent of frontage on the Hudson river, and a wide slope ascending eastward to the summit of a ridge nearly 300 feet in height, the city of Yonkers appears a city of residences; yet behind its summit ridge, and extending for more than a mile and a half upon the stream known as the Nepperhan river, which makes its way from north to south and southwestward, where it enters into the Hudson, Yonkers is found to be a

* See First Annual Report, page 190.

manufacturing city, with at least two-thirds of its population engaged in, or dependent upon, the factories.

The Nepperhan is the chief source of the water supply by which the woolen, silk and felt fabrics are washed in the various processes of making up the products of these factories. Beside these uses of the water for cleansing, washing, etc., the average hydraulic value or force of the stream itself, in its flow through the city, is estimated at nearly 300 horse-power. At present 220 of this estimated 300 horse-power is in use in the descent of the river through one mile and a quarter of its course. The Nepperhan reaches the first factory (Moquet carpets) at a point nearly one and three-quarter miles from the Hudson, in a state of purity fit for domestic uses. After serving the purpose or purposes required at that factory for the extensive washing and cleansing of wool and yarn, it reaches the next factory deeply colored, but still comparatively free from defilement. There, and from that point onward toward the Hudson river, the organic waste matters which are cast into it become more and more conspicuous and offensive. What these factories are, and what are the waste-matters which they discharge into the Nepperhan, will presently be described in a special statement by J. J. R. Croes, C. E., who attended this Board's committee in its inspections and hearings at Yonkers: Suffice it here to state, that from the three carpet factories, which are owned and conducted by one firm, 6,500 pounds of wool are daily scoured and washed; that in this process alone 2,600 pounds of loose matters are removed and discharged into the river; and that beside this upwards of 3,000 factory employés deposit their excremental outflowings in the stream.

The next factory, down stream, in the manufacture of felt and hats, discharges about 2,200 pounds of solid organic waste into the stream. Vast quantities of soda, ash-soap and oily matter, etc., are also discharged from the factories here named.

Further onward, down stream, are the Yonkers gas-works, silk factories, hat factories, brewery, morocco factory, a slaughter-house, and various mills pouring their waste matters into the stream. All the stables of the Nepperhan district, the dwelling-houses and sewers which lie within the limits of the water-shed of the Nepperhan, within city limits, discharge ultimately into this much-defiled natural watercourse. About 6,000 people are now employed in the factories and shops in this valley within city limits, and upward of 5,000 people inhabiting the dwellings make their ultimate discharge of drainage and sewerage into some point along the Nepperhan banks.

As shown in Engineer Croes' report, which the undersigned regard as quite within the limit of correct statement, there must be more than ten tons of excremental matters from the people, and probably little less than that of waste organic matter from the factories and other sources discharging into the Nepperhan within the city limits.

The capitalized wealth of Yonkers is chiefly in its manufactories. These depend greatly upon the water of the Nepperhan. The river descends over six dams in succession within the city limits, falling one hundred feet in all before reaching tide level. In its last-named "level" this river has become a vast cess-pool, one-fourth of a mile in length, and it is there reeking with stenches at all seasons of the year, except during the brief periods of great floods.

The interest and undoubtedly the vested rights of the owners and

lessees of the franchises of the river within city limits will soon, and, in the judgment of the undersigned, they now require that the entire length and width of the stream and both its banks shall be preserved and protected from the nuisances which now choke and defile it. Yet it is only recently that the attention of the manufacturers of fine fabrics, namely, the carpets, felts, yarns and silks, have had their attention sharply and urgently called to this fact by the evils experienced in their long line of products. This interest of theirs should render it natural and easy for them to accept and enforce the sanitary requirements which, in the judgment of the undersigned, must be laid upon them to prevent the pollution of their much-used mill-stream.

Hitherto the Nepperhan has served as the chief channel of drainage and sewerage for the city of Yonkers. Some of the newly-constructed sewers empty into it, while the old ditches and common house-drains for half the city find their way into it. The dwellings, stores, shops and factories alike for a mile and a half, on either side, discharge their excremental and waste matters into it (with only two notable exceptions, as pointed out in Engineer Croes' report). Even where dwellings and stores near the banks have been ordered to make sewer connections, they have in most instances continued to discharge all their sewage and excremental matters directly into the Nepperhan; while all obediently made sewer connections, they remained unused.

It appears in the evidence obtained by the undersigned that the banks and channel of this narrow stream have remained unpoliced and utterly filthy from the time the village became a city; yet ordinances of the common council and sanitary regulations, definite and apparently sufficient, have been communicated and promulgated year after year, and are now nominally in force in the city. Hence, it appears that the facilities and temptations for the continued and general violation of such ordinances and regulations, and the immunity of the offenders from the penalties are such as to warrant the municipal board of health in appealing to the Governor and the State Board.

The detailed evidence on this subject, and concerning the share which each factory and business, and each class of the community has in the total nuisance which exists, is set forth in the minutes of the hearing by the State Board, and in the report of Engineer Croes as submitted herewith. On behalf of the State Board the following conclusions and recommendations are respectfully submitted :

Conclusions.

1. The Nepperhan river, within the city of Yonkers, has become a nuisance dangerous to life and detrimental to the public health, and that from High street to the Hudson river, a distance of one and one-half miles, the causes which make the river and its banks a nuisance should be controlled by absolute police authority, and whatever engineering works are necessary to make such sanitary policing effective.

2. That the first requirement in devising means for such sanitary improvement and successful policing will necessarily be the adoption of a plan of adequate intercepting sewers to restrain and conduct away all the sewage matter and organic waste materials of every kind which otherwise will be discharged into the Nepperhan.

3. That the Nepperhan river is a natural mill-stream, the value and importance of which to the industries and wealth of Yonkers requires that it should be preserved and protected for industrial and manufacturing purposes, and that to this end, its channel and banks must be protected against the pollutions which now, or will in future, make it a nuisance.

4. That inasmuch as a board of water commissioners is at present, under authority of the Legislature, in charge of the preparation of the plans for a sewer system for the city of Yonkers, this Board should proceed without delay to perfect its plans for safe and effectual sewerage as is here referred to; and, inasmuch as the common council of said city is required to pass upon the plans and authorize and approve measures for constructing all sewers in said city, said common council should promptly pass ordinances for the construction of suitable sewers.

5. Any needless delay in perfecting and ordering sewers as here referred to will be a wrong to the people of Yonkers and a danger to the public health of the State, inasmuch as the region of the Nepperhan described in this report has become a *fever-nest*, which at any time may be a center of dangerous disease that may extend to other communities as well as to all parts of Yonkers.

6. That to facilitate the form of recommendations and orders, to secure and expedite the sanitary and public works now demanded for the protection of the public health at Yonkers, the following among other causes of evil which have herein been defined and declared to be a nuisance in and about the Nepperhan are separately stated.

(*a*) The excremental and other sewage outflow from 6,000 to 7,500 people residing or having employment near the Nepperhan within the city should be restrained from being discharged into the Nepperhan at any place.

(*b*) All sewage and other waste matters from the factories (thirteen in number) on the banks of this stream within the city, particularly the washings of waste, greasy, albuminous and all organic matters, from the wool, the skins, dye-stuffs, fabrics, etc., etc., used at the factories, also all outflow from slaughter-houses and the brewery, should be prevented from being discharged into this stream.

(*c*) That for this purpose it seems necessary that all persons, proprietors, officers and corporations responsible for any of the foregoing causes of pollution of the Nepperhan should be officially directed wholly to cease from and prevent such polluted discharges into this stream, and that, whether by tanks and reservoirs with means for precipitation and disinfection, or in part for particular factory wastes, the adoption of methods of precipitation, disinfection and filtration, or by a special system of sewerage, orders from the proper authority to protect the Nepperhan against further defilement should be in full force and effect within the briefest practicable period. In the judgment of the undersigned such a period need not be longer than six weeks from the presentation of this report, and it should be in full force until the city system of intercepting sewers shall be completed, and until the city shall have required such sewers to protect the Nepperhan against all sources of pollution.

RECOMMENDATION.

That the mayor of the city of Yonkers, the water commissioners of said city, and the board of health be furnished with a copy of these conclusions, and be advised and ordered, so far as the Governor has authority, that full effect be given to these said conclusions of the State Board of Health, through and by means of authority vested in the municipal government of the city of Yonkers.

Further, that all owners, officers and corporations which now in any manner contribute and add to the causes of pollution of the Nepperhan which renders it a nuisance, namely, those which are described in this report by the State Board of Health and its engineer, shall be peremptorily forbidden, and by police force and by condign penalties be deterred and wholly prevented from causing, or in any manner contributing to, the pollution of the Nepperhan.

Respectfully submitted,

By order of the State Board of Health,

JAMES T. GARDINER, *Chairman,*
EDWARD M. MOORE, *President,*
[L. S.] ERASTUS BROOKS,
JAMES G. HUNT,
ELISHA HARRIS, *Secretary,*

Standing Committee on Drainage, Sewage and Topography.

ALBANY, *September* 8, 1882.

The following is the report of Engineer J. J. R. Croes:

NEW YORK, *September* 4, 1882.

To the State Board of Health, New York:

I have the honor to report the result of examinations of the Nepperhan river, in the city of Yonkers, made by your order.

The Nepperhan or Saw-Mill river, draining about twenty-five square miles of hilly, sparsely-settled country, mainly occupied by timber and grazing-lands, crosses the northerly line of the old village of Yonkers, about two miles from the Hudson river, by the course of the stream, and 100 feet above tide-water.

At this point the water in the stream is free from impurities, slightly hard from the character of the soil through which it flows, and limpid when the stream is low.

From this point to the Hudson river it flows through a narrow valley, the summits of the hills bounding which are about 3,000 feet apart, and from 100 to 200 feet above the stream. On the slopes draining into the stream is the most densely populated portion of the city of Yonkers.

There are now built and discharging directly into the stream, sewers of an aggregate length of about 13,000 feet, estimated to carry the house-wastes of 3,000 people.

There are, as nearly as can be ascertained, 100 houses, the privies of which are directly over the stream or its banks, and there are ten

manufacturing establishments which discharge directly into the stream the excreta of 3,000 employés.

There are, therefore, deposited in the stream, daily, about eight tons of human excreta.

The quantity and character of the factory wastes entering the stream have been examined by me. In the three carpet mills of Alexander Smith's Sons, there are scoured daily about 6,500 pounds of raw wools, from which about 2,600 pounds of waste matter are removed. In the three hat factories of Baldwin & Flagg, Waring & Belknap, and H. W. Flagg, there are scoured daily 3,500 pounds of wool, sixty-three per cent of which is waste, making about 2,200 pounds put into the stream. The fine Cape of Good Hope and California wools used in hat-making contain a much larger percentage of sand than the coarser wools used in carpet manufacture.

The "wool suds," consisting of soap, alkalies, grease and sand, with the water used in washing, are emptied into the stream twice a day. In the carpet-works the wool is then carded and spun. In this operation about seven per cent of oil is added to it. The yarn is then scoured with soap and soda-ash, losing twelve per cent of its weight, chiefly oil and flock. About 12,000 pounds of this yarn is scoured daily, turning into the stream 1,500 pounds of solid matter.

The yarn is then bleached and rinsed in clean water, which carries off a certain portion of sulphuric acid. Some of the yarn is printed and then rinsed, which carries off the loose dye-stuff and flour. The amount is small, but the effluent discolors the stream. The rest of the yarn is dyed and rinsed. The rinsing-water is very much discolored, but contains very little that is in any way detrimental to health.

The wools used for hat manufacture are carded with oil, fulled and then washed. The effluent water is considerable in amount and contains a good deal of soap. After dyeing the loose dye in the black hats is washed out. The dye kettles are emptied into the stream about once a month, when black hats are manufactured, but for fancy colors, about one-half cubic foot of discolored water is emptied into the stream for each pound of wool dyed.

The total amount of refuse other than sewage, which is discharged from the factories in a form liable to decomposition and to become offensive, is probably not more than three tons, or three-eighths as much as the human excrement which is deposited in the stream.

This estimate includes, in addition to the above-named woolen mills, the refuse from the Westchester gas-works, the washings from Underhill's brewery, the dry liquors from Skinner's silk mills, and Kitteringham's morocco factory, and the waste from Shott's slaughter-house. The polluting matter which enters the stream is, to a large extent, retained and deposited on the bottoms and margins of six ponds formed by dams across the stream, and that which passes through them enters a tidal basin a quarter of a mile long, extending from the Hudson river to Warburton avenue. These ponds, each originally about fifteen feet deep at the lower ends, have become nearly filled with deposit from the filth put into them, and the wash from the hill-sides when drawn down one and one-half or two feet, large areas of mud flats are exposed, which are fringed with filth and garbage from the privies and houses along their banks. During the greater parts of two months during the year, the natural flow of the stream is not

sufficient to supply the demand for water for industrial purposes, and the surface of the ponds is lowered from one to two feet during the day, the upper ponds only filling up at night. The filth on the banks consequently remains there, rotting and stinking.

The only possible method of preventing this stream from being a nuisance is the exclusion of polluting matters from its channel. The fluctuations of its natural flow are so great that no form of channel can be devised which will suffice to carry off its maximum flow and at the same time be kept clean with its maximum flow when receiving the sewage of twelve or fifteen thousand people, as it will be in a few years. The records of similar streams show that there may be expected in the Nepperhan freshets discharging at the rate 1,700,000,000 gallons a day, and on the other hand, seasons when for several days its flow will not exceed 600,000 gallons a day.

To construct a masonry channel, either open or closed, of the proper capacity would be enormously expensive. The presence of such a channel would not obviate the necessity for sewers in the adjacent streets. To make those sewers large enough to carry off all pollution which would otherwise reach the stream will cost not more than one-third of the expense of making the stream available for the purpose, and will be much more effective. The only reasonable plan for abating the nuisance is therefore the construction of intercepting sewers in the adjoining streets and the enforcement of their use. As to the sizes of those sewers, and the proportion of storm-water to be allowed to enter them, there is nothing to be said here. The designing and construction of sewers in the city of Yonkers is placed by State enactment in the hands of the water commissioner alone. (Chap. 184 of 1881.) A general system of sewers, with the desired end in view has been prepared by them after careful study.

The disposition to be made of the Nepperhan river itself, after the causes of its pollution have been removed, is a matter for serious consideration. There are on its banks thirteen manufacturing establishments which employ directly 6,000 hands and indirectly support three-fourths of the inhabitants of the city. Without them, Yonkers would be a small village. Their establishment at this point was and is controlled by their ability to use the water of the river for their operations. For ten months of the year the water is sufficiently plentiful and pure for their use. It drives machinery of about 220 horse-power, and furnishes 2,000,000 gallons daily for use in other ways.

To utilize this water for power and for manufacturing purposes, the dams on the stream are essential. The ponds created by the dams are not necessarily nuisances, though they are unquestionably so in their present condition. Their immediate removal would not diminish the nuisance, but would for the present and some time to come intensify it. The withdrawal of the water would expose some twelve or fifteen acres of the bottom, on which there is an unknown depth of filthy deposit. The current in the channel would be accelerated to be sure, but it would still be charged with pollution, and the exhalation would be noisome both from it and the exposed bottoms of the ponds.

If provision is made for keeping filth out of the stream, the owners of the ponds may be required to make them not less than five feet deep in any place, and to so regulate the flow of the water that it shall never be lowered more than two feet below the top of the dams.

An important consideration, in connection with the retention of the dams, is that they enable the manufacturing establishments to carry on their operations with much less water from the city water-works than would be required if they were removed.

In 1881, the average daily consumption of water in the city was 860,000 gallons. Of this, 200,000 gallons a day were used by the factories on the stream. In August, 1882, the use by these factories was 450,000 gallons a day. This was in consequence of the low water in the stream. If the stream water was taken away from the manufacturers and they were forced to use city water for all purposes, the average daily draught from the reservoir would be nearly, if not quite, trebled. This would involve the immediate enlargement of the pumping facilities and the laying of additional force mains, and would, moreover, bring the consumption dangerously near the limit of supply, for the water-shed, from which the city water is derived, cannot be depended upon to furnish more than 3,000,000 gallons a day in a very dry year.

The removal of the dam at Warburton avenue (No. 1) seems to be expedient, however, in order to make the reclamation of the tidal basin along Main street possible. The pond above this dam is now nearly filled with filth and extends across Warburton avenue and under a number of shops on the east side of the avenue, in a wide and shallow pool. By removing this dam and carrying the stream under the avenue bridge and down Nepperhan street in a covered channel-way, an opportunity would be offered for filling in and making fit for occupation, the frontage on Main street for 1,000 feet, which is now in such a condition as to be dangerous to health, and cannot well be made otherwise by any other plan.

The steps necessary to be taken for the abatement of the nuisance are, therefore, as follows:

(1) The construction, at as early a date as possible, of a system of sewers in the streets adjoining the river, and the compulsory connection with them of drains from all the houses and manufactories along those streets and the stream.

(2) The removal from the ponds of all sediment within five feet below the level of the dam, and the walling of the margins of the ponds where buildings are on or near them.

(3) The removal of dam No. 1, and the diversion of the stream to a covered channel in Nepperhan street, and the filling of the old channel along Main street.

The completion of the works will require at least one year. The preparation of the plans and the time spent in advertising for the work, under the requirements of the city charter, will prevent any active steps being taken before next spring. In the mean time it is important that something should be done to lessen the evil at once.

The entire diversion of excrement from the stream cannot be effected without such enormous expense and inconvenience as to make it practically an impossibility. Nor is there any practicable method of excluding all factory wastes or of purifying them before going into the river. Their volume is too great.

Each of the large carpet and hat factories discharges from 50,000 to 60,000 cubic feet of water, more or less polluted, into the river in ten

hours. To retain this in any way for deposition or chemical treatment would require for each factory two tanks 1,000 feet long, ten feet wide and six feet deep, or 100 feet in diameter and seven and one-half feet deep. There is not ground enough connected with any of the establishments to erect such structures.

A great amelioration of the stream can, however, be effected, by keeping out of it the grosser impurities, and I would suggest the regulation of this in the following manner, beginning at the upper end of the fouler part of the stream:

(A) Smith Moquette Loom Company:

All water-closet matter to be run into cess-pools which must be ventilated by pipes led to above the roof of the nearest high building. Wool-suds, amounting to about 200 cubic feet a day, to be run into settling tanks and retained until grosser matters are deposited to the satisfaction of the health board.

(B) Westchester Gas-light Co:

Waste to be kept out of the stream entirely, by any method approved by the health board.

(C) Alex. Smith's Sons spinning mill and print works:

Water-closet matter to be treated as above. Water from yarn washing, about 540 cubic feet per day, treated in same manner as wool-suds.

(D) Dwellings on east side of Nepperhan avenue, between Ashburton avenue and the Croton aqueduct (about thirteen houses):

Remove privies from stream and provide cess-pools in earth.

(E) Three or four dwellings on east side of Copcutt's pond (No. 6):

Remove privies from stream.

(F) W. H. Copcutt mill-pond:

Never draw down pond more than two feet below overfall of dam; except in cool weather and full run of water the sluice gate shall be opened and as much sediment run out as practicable by stirring and scraping it at the water's edge. This to be continued until there is nowhere less than five feet of water in the pond, except where there may be hard bottom along the margin.

(G) In the Glen along Garden street:

Remove the twenty or more privies on the banks of the stream and provide cess-pools until sewer is built.

(H) Hall F. Baldwin hat factory:

Provide settling tanks for wool-suds as specified above for (A) and (C). Remove one privy from bank of pond.

(I) Skinner & Co. silk works:

Empty dye tanks into trench so dug that water will not run directly into stream, but will filter away.

(J) Alex. Smith's Sons, carpet factory:

Provide settling tanks for yarn scouring. There are 500 employés at these works, in very large and high buildings. Water-closet on each floor. There does not seem to be any practicable method of disposing of this quantity of sewage except by discharge into the stream.

In a few large buildings, several stories high, is concentrated the population of a town of considerable size, during ten hours of the day. From 1,500 to 2,000 operatives are employed, and their dejections, amounting to between 5,000 and 6,000 pounds a day, are carried by

water from closets on each floor and emptied into the stream. The practical difficulty here is on making arrangements for the temporary disposal of a large amount of matter, in a locality where the adjacent ground is nearly all occupied by buildings.

I believe that the reconstruction and rearrangement of the present method of disposal would take as long as the building of the sewers from the river to this point. The case differs from that at the factories further up the stream, in that there are more operatives in less space and with less ground available.

The ordering of any specific immediate remedy in this case is unadvisable, until a careful study of the matter has been made by the owners of the property and the health board and their engineer.

The pond should be scoured by opening the sluice in freshets.

(K) Waring & Belknap hat factory :

Provide settling tanks for the wool-suds as in similar works above. The dejections of about 200 operatives, which now pass into the stream, to be diverted and cared for in the same manner as those of the rest of the employés are now.

(L) E. Underhill's Son brewery :

The wash-water from the tubs and barrels is offensive. There seems to be no means for immediate relief.

(M) John C. Shotts' slaughter-house :

Keep refuse out of stream.

(N) Kitteringham & Co. morocco :

About 2,000 gallons of dye and wash-water enter the stream daily. Just at this point a filthy sewer and drain enters the stream. There is no relief practicable except by the proposed intercepting sewer.

(O) H. W. Flagg hat-factory :

The wool-suds to be settled before entering the stream. One hundred employés. Employés' dejections to be kept out of stream if a practicable method of doing so can be devised.

(P) W. Macfarland silk-works :

Thirty-seven employés. Their dejections to be kept out of the stream, pond should be flushed and scoured in freshets.

(Q) Two stables and about twenty-five privies over the stream, between dam No. 4 and Getty square. Garbage from houses thrown into the stream.

Privies should be removed, and either earth-closets for dry removal be substituted, or a sewer pipe laid in the rear of the buildings along the stream to a connection with the Main street in Getty square.

(R) The interior of the block bounded by Broadway, Main street and Warburton avenue :

The abolition of the privies and the making of connection with the Main street and Broadway sewers, to be compelled at once.

The occupants of some of the buildings on this block have already been compelled to make connection with the sewer, by order of the health board, but have laid the pipes no farther than through the cellar wall, and do not use them.

Peake's and Copcutt's ponds to be scoured in freshets. The temporary remedial measures here suggested may be briefly formulated thus :

(1) Remove all privies on the line of the stream.

(2) Wherever practicable, keep the discharge of factory water-closets from entering the stream.

(3) Compel the precipitation of the grosser matters held in suspension in the water from wool-washing and yarn scouring, before it enters the stream.

(4) Compel the scouring of the ponds by opening the lowest sluice-gates in the first freshet.

Although the factory water-closets pollute the stream to a degree dangerous to health in excessively hot and dry weather, they do not create so directly offensive and horrible a nuisance as does the use of the margin of the stream as a place of deposit for excrement and garbage by the people who live along and over it.

Immediate stopping of this use or more properly abuse is practicable, and is therefore recommended. But the immediate disuse of the various sewers and the factory water-closets which empty macerated and diluted sewage into the river is not practicable.

I desire to acknowledge my obligation to Mr. W. W. Wilson, the engineer to the water commissioners for much valuable information and assistance, and to the proprietors, of the factories for access to their works and information regarding their machinery and methods.

Respectfully submitted,

J. J. R. CROES.

(*a*) *Pollution of a mill-race and pond in the village of Oneida.*—From the village of Oneida, a complaint was received concerning the condition of a certain race-way and mill-pond located in the heart of the village, and causing much suffering and distress by noxious exhalations from the water. The matter was duly investigated by this committee last October, and a full statement thereof is found in the following report.

ROCHESTER, N. Y., *December* 1, 1882.

To the Secretary of State Board of Health:

DEAR SIR— Permit me herewith to transmit to you the following results of my inspection, made by request of your Board, on October 7, 1882.

On the pollution of a mill-race and mill-pond in the village of Oneida, N. Y.—The flourishing village of Oneida is located near the north-eastern corner of Madison county, and has a population of about 3,500. Directly through the middle of the town the Erie canal feeder runs in a northerly course, and extending easterly therefrom, a race-way for the supply of a small mill-pond and water-privilege has been excavated between Main and James streets. All of the water used for power and flowing through this race-way is derived from the feeder through the gates of a waste-weir; and it is thus taken and appropriated by the owner of a mill-privilege in accordance with the terms of an old contract originally executed by the Oneida Lake Navigation Company, whose works and franchises subsequently became the property of the State for canal purposes, subject, however, to all private agreements and concessions formerly granted by said corporation. By virtue of this contract, the owner of the mill and race-way is entitled to all of the surplus water flowing in the feeder which is not required for canal purposes, but the exact volume is not definitely

stated. The race-way and its small terminal mill-pond are thus seen to be private property; and it is of the condition of these premises that complaint has been made to your Board.

An examination of the locality shows that the said race and pond have been constructed between two principal streets in the center of the village, leaving between the sides of the excavation and the said streets only a comparatively narrow strip of land on each side, both of which are now almost entirely covered with business blocks, hotels and tenements. As there are no public sewers in the two streets adjacent and parallel to the race-way, and as there is no yard room in the rear of the buildings mentioned, the race-way has gradually been made a convenient receptacle for the offal and organic wastes of all the contiguous buildings, many of which have privies projecting out over the water. While the pond is full, there is only a slight current in the race, since the water-supply is limited to the excess in the feeder not required for the use of the canal; and at such times a large proportion of the heavier organic matter has ample opportunity to settle upon the bottom of the excavation or become lodged in the stones and bushes that line its sides. But as in all other cases where a small constant water supply is stored for an intermittent power, the accumulated volume of water is drawn off in a relatively short period of time when much power is required; and the sides of the race, together with a large area of mud and accretions of organic matter in the shallower portions of the pond, are accordingly exposed to the air until they again become covered with water. The great amount of offensive matter thrown into the race and washed down into the pond, in conjunction with the frequent exposures of the bottom and sides while the mill is in operation, have caused during the summer months an extensive development of disagreeable odors and noxious exhalations, to which the most of the sickness in the village has been ascribed.

It is, therefore, apparent that the nuisance complained of by the village authorities is due primarily to the filthy condition or direct pollution of the race-way, which is several hundred feet long; and indirectly also to the accumulation and intermittent exposure of organic matter in the small mill-pond, as already mentioned. The decay of algae in the pond in consequence of fluctuations in the water surface may also have its share in producing offensive odors; but this may, for the present, fairly be neglected in comparison with the other causes.

The remedy for the evil is simple, and consists in a thorough cleansing of the race-way and mill pond, combined with a rigidly enforced prevention of subsequent pollution by sewage, fæces, or any other kind of organic refuse. So long as the race is treated and used as an open cesspool, sickness and annoyance will be sure to follow; and if the occupants of the various buildings and hotels abutting upon the race object to a system of sewerage, their wastes and offal must be removed in some other and less convenient manner. To all of these propositions the attention of Dr. H. W. Carpenter, the president of the board of trustees, was duly drawn, and the urgent necessity of taking prompt action in the premises was fully realized by all present.

Respectfully submitted,

EMIL KUICHLING,
Civil Engineer.

(*e-f*) *Mud margins of Seneca lake at Geneva, and South bay at Hudson.*— The attention of this committee was also called to the malaria and sickness caused by the exposure of foul mud margins of Seneca lake at Geneva, and of South bay at Hudson. Both of these cases were carefully investigated, and the results are fully recorded in the following reports made to the Board by Emil Kuichling, of Rochester, and Wm. S. Egerton, of Albany, the civil engineers employed for the occasions:

ROCHESTER, N. Y., *December* 12, 1882.

To the Secretary of the State Board of Health:

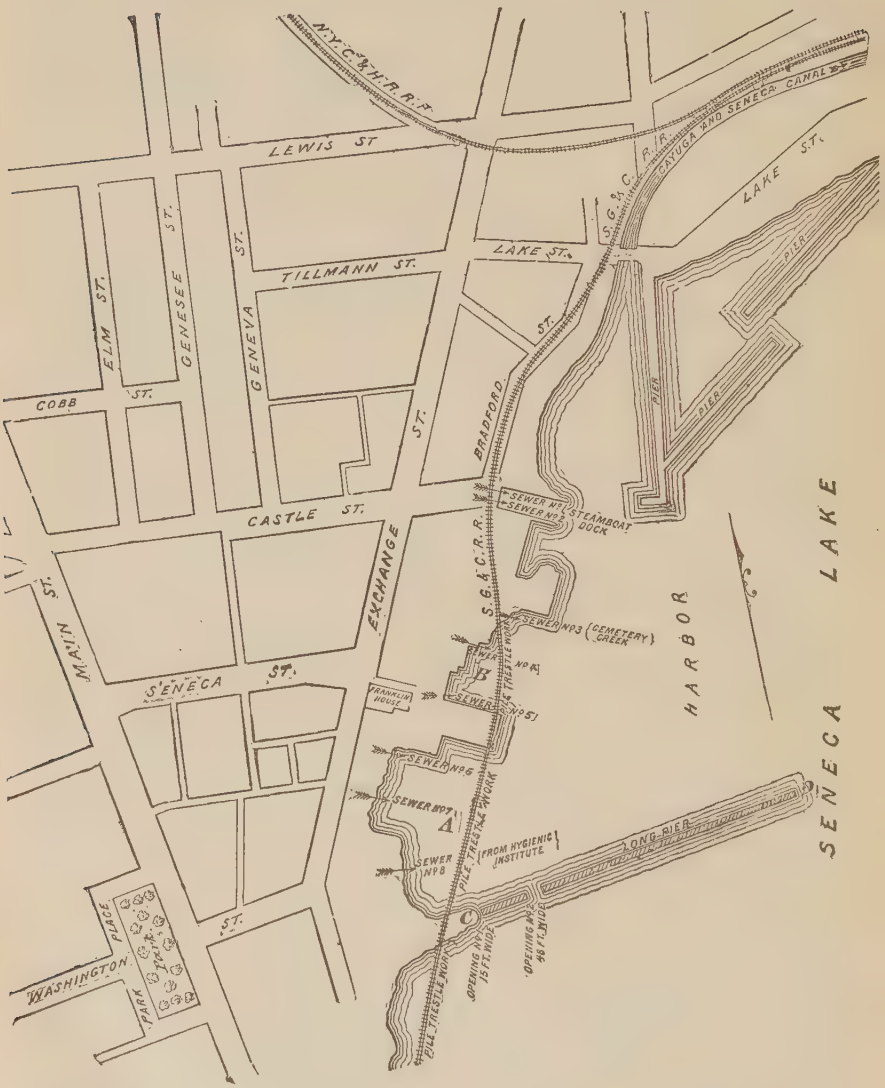
DEAR SIR— In accordance with instructions recently received from your Board to investigate a certain nuisance in the village of Geneva, Ontario county, N. Y., caused by the muddy margin of Seneca lake, and extending from the long pier or break-water, for some distance northerly to the rear of the Franklin House, the undersigned begs leave to state that he made a thorough examination of the locality on Wednesday, November 29, and would now respectfully submit the following report:

The large and flourishing village of Geneva is situated at the north-western corner of Seneca lake, and has at present about 6,000 inhabitants. The southern portion of the town is built upon a hill which rises quite abruptly from the water, leaving only a very narrow beach; while in the northern portion the ground slopes gently upward from the lake, and then becomes comparatively level, thereby affording topographical advantages for the erection of numerous business blocks and manufacturing establishments of various kinds. The village possesses a relatively large commerce, owing to the means of communication presented by the large lake, by the N. Y. C. & H. R. R. R., and the S. G. & C. R. R., and also by the Cayuga and Seneca canal. This latter is an important branch of the Erie canal, and enters the lake at the north-western corner, where a commodious artificial harbor has been formed for the safety of canal boats and other vessels, by the construction of a system of jetties, or break-water piers, which extend out into the lake from the western and northern shores, as shown upon the accompanying map.

Now as the natural outlet of the lake is near its north-eastern corner, or directly across from the village and more than one mile distant, and as the harbor is the most convenient place into which to conduct the drainage from the adjacent territory, it is not surprising that much organic matter should have accumulated in this portion of the lake, and induced an extremely luxuriant growth of water-weeds and the smaller algae in the still water within the piers. The decay of this aquatic vegetation, which is facilitated by fluctuations in the surface of the lake, is often the source of a most offensive odor; and it is of this that the village board of health has principally made complaint and addressed a memorial to the Governor, by whom the matter was referred to your Board for investigation and advice.

By referring to the map which I have carefully compiled and reduced from such maps as were placed at my disposal by the village authorities, it will be seen that there are in the long pier or break-water, marked CD, only two openings for the passage of water, one of

Map of Harbor of Geneva, N. Y. November 26, 1882.



E. KUICHLING, C. E.

fifteen feet width, immediately adjoining the shore, and the other of about forty-eight feet width, located about 175 feet from the former: and also that the Syracuse, Geneva and Corning railroad, which is here built along the western shore of the lake, has cut off from the harbor two small bays or indentations, marked A and B, the railway track being, however, carried across the said bays upon a system of timber piles, driven in groups of four and spaced about twelve feet apart longitudinally, thus leaving ample room for the circulation of the water between the harbor and the shore. These two bays are irregular in shape, their greatest dimensions being respectively about 500 feet long and 280 feet wide, and 250 feet long and 150 feet wide, while their areas are respectively about two and one-fourth acres and one-half acre. The water inside of the railway trestle-work is generally quite shallow, its greatest depth not being more than five or six feet, except in a few places, and the bottom is covered with aquatic plants of many varieties. The shore of the larger basin, marked A, is very flat and muddy, so that a comparatively slight change in the level of the lake will either cover with water or else expose to the air, a relatively large area of black and offensive mud, which sustains a dense growth of small algae; and as the lake is considerably affected by the wind, such fluctuations and consequent exposures are of frequent occurrence. In the smaller basin, marked B, the shore is not so muddy, and is protected in great part by low docks and the foundation walls of buildings.

A close examination of the locality showed that the original shore of the lake was some distance inland, and that the lake had manifestly been encroached upon by filling up the shallow margins with earth and all kinds of rubbish, such as brush, ashes, garbage, and general refuse matter from streets and manufacturing establishments. The village, moreover, is not provided with any system of sewerage, and all that has been accomplished in the matter of drainage and sewerage has, with only a single exception, been executed by private enterprise. Under such circumstances, it is natural that each individual should have sought to remove the wastes from his building in the cheapest and most expeditious manner, by constructing a drain directly into the harbor, the mouth of the drain terminating at the shore; and as these drains were made much larger than necessary for one dwelling or place of business, other buildings were gradually connected with them, until each of these sewers or drains at length serves to remove the wastes from an entire group of buildings, and to discharge its contents upon, or very near to, the shore. From Washington street to Castle street, a distance of about 1,100 feet, there are no less than seven such private sewers, and one large public sewer from the higher portion of the village, emptying into the harbor; and of these eight sewers, five discharge into the two shallow bays or basins, A and B, which have been cut off from the harbor by the railway trestle-work, as shown upon the map. It is difficult to estimate the quantity of sewage matter thus deposited along the margin of the harbor between the above-named points, but it is probably fair to assert that at least two hundred private dwellings, a number of business blocks and two large hotels are connected with these eight sewers.

From the foregoing statements and description of the harbor, it will now be easy to understand how the offensive odors arising from the

shallow basins, designated A and B, and also from the foul, muddy margin of the larger basin, in particular, have been, and continue to be, produced to such extent as to become a public nuisance. The piers, or break-waters, which form the harbor, have prevented the waves from beating upon the shore and thus uprooting the larger water-weeds. The latter have, therefore, been unrestricted in their growth, and have in turn thrived upon and retained near the shore much of the organic matter derived from the surface drainage, the numerous sewers, and the rubbish which was thrown into the shallow water along the original shore, in order to gain land. In the stagnant water thus created a new species of small algae, belonging to the *Nostoc* family, and having the property of emitting an intensely disagreeable odor when undergoing decomposition, has sprung up and is being nourished by the abundant organic substances deposited in the water and the mud-margin by the incessant flow of sewage. This class of algae flourish in warm weather, and they increase with wonderful rapidity, often forming masses of large size in the latter part of the summer; but they are quickly killed by exposure to the air and hot rays of the sun when the water level is lowered by storms, or in times of drought, or when they become entangled in the stems and leaves of the larger weeds, or are driven ashore by the wind; and in decaying they give off a large amount of gelatinous or slimy matter which soon putrefies and emits the nauseous odor complained of. The decomposition of the sewage also contributes to the evil resulting from the presence of these algae, but to what extent it will be difficult to determine. At the time of my examination, the water in the lake was quite low, so that a large area of mud was exposed in the bay or basin, marked A, which showed in the most positive manner great bars or deposits of sewage matter about the mouths of most of the drains already mentioned; but as the surface was then frozen, no odor was perceptible. In the summer, however, the exposure of this mud can scarcely fail to become eminently dangerous to the public health.

To remedy the evil thus resulting from the construction of the harbor on the one hand, and from the pollution of shore on the other, I venture to submit the following suggestions: First, that the village authorities take the necessary measures to prevent the discharge of sewage into the harbor and along the shore. This can readily be accomplished by the construction of a suitable intercepting sewer along the lake front, or through Exchange street, by which all organic wastes will be deposited into the lake in sufficiently deep water through one or two properly selected outlets; second, that the existing mud margins in the two bays or basins, marked A and B, be abated, either by dredging, or else by filling in with fresh and clean earth to sufficient depth to remain above the level of ordinary high water in the lake; also that the shallowest portions at least of the bays themselves be treated in a similar manner; third, that a larger opening be made for the passage of water through the long pier or break-water, marked CD, so as to secure a better circulation of the comparatively stagnant water in the harbor, since in low water the present small opening is entirely dry, while in the larger one the water-way is reduced to a width of not more than about twenty-five feet, in consequence of the deposit of large stones upon which the crib-work is built. To be effective, the

entire shore section of the break-water between the two existing openings should be removed, and this could readily be done without detriment to the harbor as a place of refuge for vessels.

In regard to the effect of the construction of the trestle-work of the S. G. & C. R. R. across the two shallow bays, A and B, in obstructing the natural circulation of the water and thereby causing the growth of the water-weeds therein, it is my opinion that the piles are sufficiently far apart to afford ample space for a free and natural flow or interchange of the water in the harbor and said bays; and were it not for the dense growth of eel-grass and other large water-weeds which now prevents or greatly retards such circulation, and often becomes so luxuriant as to offer serious resistance to the passage of small boats, I do not think that this question would be raised.

With reference to the larger and coarser varieties of aquatic vegetation which also grow in great quantities for a considerable distance beyond the line of the railway, I can discover no other effective method of relieving the harbor of their presence except by occasional dredging: but the results of such work would only be temporary, as the conditions favorable to their growth cannot be wholly removed without destroying the harbor itself. As, however, the State owns and controls the harbor, and as both the State and the village have important interests in its proper conservation, it will become desirable that whenever such clearing out or dredging may once be ordered by the State authorities, the village should at the same time be required to refrain from depositing any sewage in the shallow water near the shore, and to conduct said sewage through suitable conduits to such outfalls as will cause the least injury to the harbor afterward.

To carry out the suggestions made above, it may perhaps be necessary to obtain special legislative enactments, which will define in an equitable and satisfactory manner the several public and private interests and obligations involved in the premises; but as the consideration and settlement of these questions is not in my province, no further cognizance of them need be taken here.

EMIL KUICHLING, C. E.

*Preliminary Report upon the South Bay at Hudson.**

To the Secretary of the State Board of Health:

DEAR SIR—After a careful examination of the South bay at Hudson, made in company with the city engineer Mr. George C. Power, I am of the opinion, first, that to secure additional circulation and effective scour of the area embraced by the South bay, an additional opening in the railroad embankment northward would be of no material benefit; second, that to cover this area to a depth of one and a half feet at low tide in the Hudson, by erecting a dam of sufficient height at the present opening, would, as long as deleterious drainage and sewerage is permitted to flow into this basin, but increase, if any thing the existing defects, and lead to further and more tangible complaints.

* The Governor, having referred various petitions and complaints relating to the South bay, to this Board, the evils complained of were soon traced to defects of drainage and sewerage of the city.

My opinion with reference to the relief to be secured by an additional opening northward is based upon the fact, that the trend of the tidal currents is in a direction approximately parallel to the railroad embankment and nothing but a flushing action can be secured from this source of additional supply.

The filling of slag and detritus from the iron works, the location of the adjacent pier, and an examination of the mud-flats defining the channel at low water, all west of the railroad, form obstructions to an effective influx or scour of the tide. Such action would be limited to a comparatively small area, not affecting in the least the present status of the bottom, or the circulation at the marginal flow lines eastward or northward.

The tidal action, in my opinion, would be similar to that of flushing a sewer, and at high tide, permit whatever sediment might be brought by the inflowing waters to settle upon the flats and add to the accumulations now being deposited by the streams and natural watercourses.

An examination of the water within the South bay throughout the length of its shorter diameter, at low tide, did not disclose any impurities, and no odor was perceptible, the water was clear, a slight current toward the opening at the railroad observable, and small fish were seen in large quantities at different points.

The only objectionable point was found at the existing outlet of the culvert, which receives a part of the city drainage and discharges directly into the South bay at its north-easterly margin.

The easterly half of the bay is covered with a rank growth of aquatic plants, which, during the period of growth, cannot be materially detrimental to health, but in the fall, when decay takes place, must be a source of complaint, and affect the atmosphere deleteriously. A permanent covering to a depth of one and a half feet of this area, would not check the growth of this character of vegetation.

Effective and beneficial results can be secured by maintaining an open course for the drainage, from the aforesaid culvert, in a direct line with the present opening at the railroad embankment; the maintenance of direct and open channels for the inflowing streams, and if possible the burning of all vegetation before decay takes place, supplemented by a gradual filling-in of the northerly half of the area at present laid bare at low tide.

Respectfully submitted,

(Signed) WM. S. EGERTON, C. E.

IV. *Systematic Sewerage and Drainage of Towns and Villages.*

The impulse given to the consideration of sanitary questions by the general establishment of local boards of health in the towns and villages throughout the State, consequent upon the institution of the Central State Board, and owing in great measure to the zeal and perseverance of the latter, has resulted in a most gratifying demonstration of interest in the subject of drainage and sewerage by the citizens of a number of large villages. Requests for advice have been numerous, and have been responded to and encouraged both by the committee and the civil engineers in its employ.

The problems presented are often of the most complex character, and require considerable preliminary labor before a rational conclusion adapted to the special circumstances can be submitted. As, however, such necessary preliminary work and the collection of necessary data or local statistics is quite expensive, and belongs rightfully to the village or town seeking the Board's counsel, the committee was compelled in most cases to deal with the subject of sewerage in general terms alone, and to postpone the expression of a definite opinion in particular cases until the said village or town authorities shall have caused the requisite statistical and topographical information to be properly prepared.

Among the larger villages whose authorities have sought advice relating to sewerage from the Board, we mention Batavia, Geneva and Oneonta; while among the cities of the State, applications for counsel have been received from Buffalo, Schenectady, Yonkers, Hudson and Auburn. Visits to these places were made as soon as practicable with experienced engineers; but as it was generally found that conditional opinions alone could be given upon the particular questions submitted in consequence of the lack of the requisite maps and data, the local authorities were advised how the latter ought to be prepared, and received meanwhile from the experts such general suggestions relating to proper sanitary drainage and sewerage as the circumstances warranted.

In illustration of the examinations of localities with reference to sewerage that have been undertaken by the committee upon appeal from the respective local authorities, the following reports which have been made to the committee by its engineers in relation to some of the above-named places are herewith submitted:

To the Secretary of the State Board of Health:

Dear Sir— In the latter part of last May, I was requested by your Board to advise with the municipal authorities of the city of Hudson in regard to the contemplated sewerage of a portion of that city, and was notified that the date of this conference had been fixed for Monday, June 5. I accordingly went to Hudson, and was met on the day mentioned by Recorder Hoysradt and the health officer, Dr. Cook, who informed me that both Mayor Hoysradt and City Engineer Powers had been unexpectedly called away from the city, and that the former, who had deeply interested himself in the sewerage question, could not return for several days. At the request of the officials present, however, I examined the locality under consideration as thoroughly as was then practicable, and in the absence of the necessary statistics and engineering data, submitted to them such general suggestions relating to the proposed sewerage as I deemed pertinent. These suggestions, together with a general statement of the local conditions attending the problem, I have now, at your request embodied in the following report:

The city of Hudson is built upon the ridge of a large spur of the hill on the eastern bank of the Hudson river. This spur rises quite abruptly from the river to a height of about fifty feet, and its transverse section then becomes trapezoidal, the top being nearly flat, while

the sides slope rapidly down into the beds of the adjacent valleys. Longitudinally, or in an eastern direction, the upper surface of the spur gradually widens and rises for a distance of about one and one-half miles, terminating in "Prospect Hill," an eminence 300 feet above the surrounding lands and 500 feet above the river. Two shallow bodies of water, called North and South bays, extend inland on each side of the ridge for nearly 1,000 feet from the general line of the shore, thus causing the western portion of the spur to become a promontory. Both of these bays receive the drainage of a comparatively short lateral valley having more or less steep slopes, from which large quantities of earthy matter are annually washed down by the rain; and both are moreover almost wholly separated from the river by the embankments of the N. Y. C. & H. R. R. R., communication between the waters of the bays and river being maintained only through relatively small openings left in the road-bed. Almost all of the buildings and dwellings of the city are located upon the gently rolling surface of the ridge, so that extremely favorable conditions for excellent sewerage and drainage are here presented.

The district proposed to be sewered is virtually the southern half of the town, and may be described as being bounded on the north by Warren street, which is the principal thoroughfare of the city, and extends along the crest of the ridge from the bluff at the river to the foot of Prospect Hill, and on the south by the small ravine or valley terminating at South bay. The Boston and Albany railroad and two or three public streets cross over the upper portion of this ravine upon high earthen embankments, at the bottom of which small culverts have been constructed for the passage of the water; but in consequence of some defect or obstruction in the culvert under the railroad embankment, a pond of considerable extent has been created in the ravine immediately above said embankment. At the date of my visit the water in the pond was so high as to entirely conceal the mouth of the culvert. A little further up the valley one or two public sewers and several drains from adjacent dwellings were found to be discharging their offensive contents into the small rivulet which courses through the ravine and supplies the pond. In dry weather the flow of this rivulet is considerably less than the volume of sewage emptied into it, and we, therefore, have here the unusual spectacle of a large open sewage reservoir, located closely in the rear of a thickly populated district.

Below the railroad embankment, the northern bank of the ravine is lined with elegant residences for a long distance, and here again a number of other sewers and drains from both streets and dwellings are conducted into the valley, their contents in some cases being allowed to flow freely down the steep slope until they reach the small water-course in the bottom. Several years ago complaint was made of the effluvia arising from the rivulet in summer time, and the city was finally compelled to construct a covered conduit or sewer of considerable length through a portion of the lower valley in place of the open stream.

From the foregoing it will thus be seen that a comparatively large amount of slightly diluted sewage is at present conveyed, mainly in a small and open water-course, through the ravine into South bay. The latter is, however, merely an extensive but quite shallow marsh, overgrown with rushes and other aquatic plants, and affected moreover by

the tide, so that at ebb large areas of mud are left exposed to the air. In view of such circumstances, it is by no means surprising that an unhealthy condition of the city has ensued.

For remedying the existing evil, two plans were submitted to me for consideration by the health authorities. The first was to convert the natural open water-course in the valley entirely into a covered sewer which should ultimately receive through lateral branches all of the sewage of the southern half of the city, while the second contemplated the construction of a new system of sewers in the streets along the edge of the bank, and the discharge of the sewage directly into the river. The former plan I rejected at once, not only because it would require a very large and costly conduit to carry away the storm drainage of an extensive hilly area, but also because it would leave the sewage to be deposited in South bay, which, from its nature, is utterly unfit to be made a receptacle for such matter, and should, on the contrary, be preserved rigorously from any kind of contamination. The latter plan, on the other hand, is vastly more rational and economical, and, with a few modifications and additions, received my approval.

As the city engineer was absent, and as no accurate maps, profiles and other necessary data and statistics could then be produced, it was impossible for me to consider the problem otherwise than in a general manner, and to point out to the municipal authorities some of the details involved in the preparation of an intelligent design for a modern system of city sewers. The substance of the recommendations made by me are herewith submitted for your consideration.

1. To intercept all public sewers and private house drains now discharging into the ravine or valley, from the head of the latter at or near Worth avenue to the Hudson river. This interception to be accomplished by means of a suitable modern tight sewer laid through the following named streets: Warren street, from Worth avenue to South Seventh street; South Seventh street, from Warren street to Union street; Union street, from South Seventh street to South Fifth street; South Fifth street, from Union street to Allen street; Allen street, from South Fifth street to South Third street; South Third street, from Allen street to Montgomery street; Montgomery street, from South Third street to the edge of the steep slope descending toward the river, and from the said edge out into the "Hudson" channel of the river by means of iron pipe.

2. The sewage thus intercepted to be discharged so far out into the river as to preclude the possibility of its being swept by the usual currents of the stream easterly into South bay through the opening in the embankment of the N. Y. C. & H. R. R. R.

3. To regard the route outlined above as subject to more careful study of the topography and other local conditions, since the necessary data were not then furnished.

4. To make the new system of sewers for the removal of sewage only, wherever expedient, and to allow the rain fall to flow away over the surface into the adjacent valley. If required, a short and shallow transverse drain may be constructed at suitable intervals for the purpose of conveying storm waters from the intermediate areas more expeditiously into the natural water-course of the valley. It should here be remarked that I was informed that a large portion of the ravine

was private property, and that the owners strongly objected to the discharge of any further drainage from the city into it. Without discussing the validity of this objection I advised the authorities to submit the case to competent jurists, and then to be guided by their opinion. Should the circumstances attending the case be so peculiar as to prevent the city from permitting its surface drainage to flow freely into the adjoining natural water-course, the new intercepting sewer must obviously be designed to receive the rain-fall as well as the sewage, whereby the expense of its construction will be greatly increased.

5. In order to facilitate a rational and economical design for the proposed system of sewers, I advised the preparation of a proper topographical map of the entire district, and the collection of all available data relating to the existing public sewers thereon, together with the statistics of rain-fall, water-supply, dwellings and population. Also to determine by a series of experiments with floats how far from the shore out into the river it will be necessary to lay the sewage discharge pipe so that its contents shall not be carried back by the currents into South bay. Observations should also be made concerning the maximum flow in each intercepted sewer, and the peculiarities of each subdivision of the district thoroughly studied, in order to determine how much of the rain-fall it may be advisable to admit into the new sewers, and thus arrive at their proper dimensions. It is only when provided with such information that the details of a scheme for sewage can be intelligently and satisfactorily planned.

6. Finally, and for the purpose of improving the present condition of the public health, I recommended the clearing out, or lowering if necessary, of the culvert under the embankment of the Boston and Albany railroad already mentioned, so as to remove the pond of sewage, and the adoption of such measures as will insure throughout the whole valley a free flow for the unpolluted natural surface drainage from the hill-sides into South bay.

Respectfully submitted,

EMIL KUICHLING,

Civil Engineer.

ROCHESTER, N. Y., *December* 1, 1882.

To the Secretary of the State Board of Health :

DEAR SIR — Permit me herewith to transmit to you the following report, made by request of your Board.

On the sewerage of Oneonta.— The village of Oneonta, in Otsego county, is pleasantly situated on the northern side of the Susquehanna river, and has at present a population of about 2,500. Last year it was provided with an excellent system of water-works, in consequence of which the attention of the citizens has been directed to the subject of the proper removal of the resulting liquid waste, and an appeal for practical counsel and advice pertaining to systematic sewerage for the village was accordingly made to your Board.

The principal portion of the village is built on the hill-side, but the map of the corporation shows that a large portion of the broad alluvial flats, lying between the foot of the hill and the river, has also been laid out into streets and building lots, thus anticipating a great in-

crease in size and population. Directly in front of the town a large area of this low ground is quite marshy in consequence of insufficient drainage; and into a sluggish and badly defined water-course traversing it, a considerable amount of sewage is permitted to discharge from one or two small public sewers, besides a number of private drains from the buildings on the adjacent slope. In the main part of the village the face of the hill is serrated by two or three large gullies, with a number of minor depressions, through which the natural surface drainage finds its way into the river. These natural water-courses contain, however, very little water in dry seasons, and the quantity, therefore, becomes appreciable only during times of rain-fall.

From the foregoing brief description of the topography of the village, it will be seen that all storm water can readily be conducted into the conveniently located gullies and tributary minor depressions; and hence, also, that a system of sewers for the present populous area on the hill-side would be designed most economically if the pipes were proportioned so as to remove only the liquid wastes, together with as much rain-fall from the roofs of the buildings as might be deemed expedient. The flat and swampy area between the hill and the river can easily receive a separate and distinct treatment, and the same remark will also apply to the lower part of the western district, since in both cases there is abundant fall available for thorough drainage and sewerage, whenever the latter may become necessary.

It should here be mentioned that no definite conclusions regarding dimensions for the contemplated sewers, and the most advantageous routes therefor, could be reached at the time of my inspection, on September 7, 1882, as the necessary data for the rational determination of the problem had not been collected and provided by the village authorities. I could, therefore, only deal with the question in general terms, or else proceed upon unverified hypotheses, which was done in a few instances merely for the sake of illustrating how the sizes of sewers are determined, and of explaining the difference between the so-called "separate" and "combined" systems.

In order to become prepared for an intelligent discussion of the sewerage of their village, I advised the local board of health and the trustees to cause a proper topographical map of the corporation to be made, so that an engineer could quickly recognize the several natural drainage areas in the district, and plan his work with reference to them. A map of this kind is practically indispensable, since from it all sanitary experts can readily form an opinion regarding the principal features of any contemplated scheme for sewerage, and give it their approval or else point out wherein it may be deficient; it will, moreover, have a permanent value to the residents, as upon it there will be delineated the course, size and depth of every branch and main in the entire district. In the science of engineering, there are no mysteries; and the true expert seeks rather to explain the various difficulties that encompass his work, instead of becoming possessed of exclusive information pertaining to a given locality. A topographical map is, therefore, not only a valuable safeguard to the community at all times, but it also imparts a healthy stimulus to the engineer who may be called upon to design a system of sewerage and drainage, as he then becomes conscious that his plans may at any time receive the

critical scrutiny of other, and perhaps more experienced, members of the engineering profession.

In the case of Oneonta, a ready and convenient ultimate outfall for the sewage is afforded by the Susquehanna river, and the facilities are also present for disposing of the sewage either by means of broad irrigation upon the level field adjoining the stream, or else by means of intermittent filtration. The time is, perhaps, not far distant, when the pollution of our rivers, which are used as sources of water supply for cities and towns along its course, will be prohibited by law in the interest of public health; and it is, therefore, a subject of grave consideration for the local authorities, as well as for the State, how to dispose of the liquid organic wastes of a large and rapidly growing community. To this element of the general problem of sewerage, the attention of the trustees and board of health was earnestly directed, so that due provision for a future partial purification of the sewage could be made in the design.

As the time at my disposal was limited, I was unable to make any instrumental surveys, and could accordingly not give definite advice respecting certain routes for a trunk sewer that were proposed. Such opinion, however, as I could form simply by a hurried examination of the locality was duly imparted to Mr. W. L. Brown, president of the village board of health, Dr. Case, the health officer, and Mr. Walling, the resident surveyor, with the recommendation to carefully survey the district before finally deciding upon the course.

Respectfully submitted,

EMIL KUICHLING, C. E.

ROCHESTER, N. Y., *March* 27, 1882.

To the Chairman of Committee on Drainage, Sewerage and Topography; State Board of Health:

DEAR SIR— In relation to the several questions pertaining to public health which have been submitted to your Board by the mayor, the board of health, and other officials of the city of Auburn, N. Y., the undersigned, who was directed about the beginning of this month, to examine into said questions, begs leave to submit the following report:

The accompanying documents were transmitted to me, from Dr. E. Harris, Secretary of the State Board of Health, and consist of the following:*

1. A letter, marked (A), to Dr. E. M. Moore, from D. M. Dunning, of Auburn, N. Y., dated January 31, 1881, and asking advice concerning a contemplated main sewer for draining an area of about 100 acres of said city.

2. A diagram, marked (Aa), accompanying the aforesaid letter.

3. A letter, marked (B), to the State Board of Health, from Hon. D. M. Osborne, mayor of Auburn, N. Y., dated February 8, 1881, and asking general advice in the matter of sewerage and drainage of cities and towns.

4. A letter, marked (C), to Dr. E. M. Moore, from Charles L. Sheldon, of Auburn, N. Y., dated February 8, 1881, and referring to the same matter contained in the letter marked (A) above.

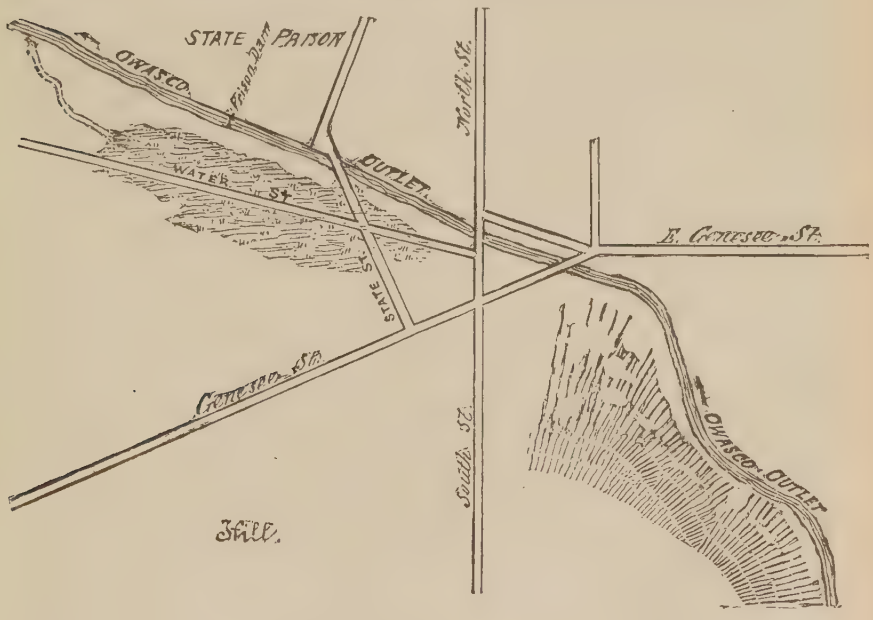
* Not printed.

5. A letter, marked (D), to Dr. E. Harris, from Dr. Theo. Dimon, of Auburn, N. Y., dated December 27, 1881, and relating to a certain district, adjacent to Water street, in said city, which is rendered swampy in consequence of back water in the Owasco outlet caused by the prison dam.

6. A letter, marked (E), to Dr. E. Harris, from Dr. John Gerin, health officer of Auburn, N. Y., dated February 7, 1882, and referring to the pollution of the Owasco outlet by the sewage of the city of Auburn.

The undersigned has read attentively all of the above-named letters, and on March 17, 1882, went by appointment to Auburn in company with Dr. E. M. Moore, prepared to examine into the several questions submitted to your Board by the municipal authorities. Through some misunderstanding, however, we did not meet the local board of health, but were received instead by the school board, who had obtained the impression that an examination of the condition of the public schools of the city was to be made. Considerable time was thereby

Diagram showing Water Street Swamp District in Auburn, N. Y.



lost which might have been devoted to the real object of our visit; and we were consequently compelled to accept and proceed upon the data kindly furnished by Mr. Sheldon and Dr. Dimon, from whom we learned the following:

1. That the main sewer alluded to in the letters of Mr. Sheldon and Mr. Dunning, marked (A) and (C), was recently built to the entire satisfaction of all parties interested, and that no examination of said sewer question was now required.

2. That the communication of Mayor Osborne, marked (B), probably had reference to the same subject, and accordingly needed no further attention.

3. That in relation to the question of the pollution of the Owasco outlet by the sewage of the city submitted by Dr. Gerin and marked (E), there appeared to be at present no occasion for alarm, since said stream contained at all times a sufficient quantity of water to thoroughly dilute and quickly remove beyond the corporation limits the sewage matter which is now discharged into it.

The complaint of Dr. Dimon, marked (D), therefore alone remained to be investigated, which was done as thoroughly as the opportunity permitted. From the evidence presented, it appears that a small swamp had formerly existed in the vicinity of what is now called Water street in said city, and that this swamp extended for some distance along the southern side of the Owasco outlet, reaching from the stream to the foot of the hill now covered by the principal portion of the city, as indicated upon the appended diagram; also that said swamp was in existence long before the construction of the State prison dam, and that the original banks of the stream were higher than the surface of the marsh. Within the city limits, the Owasco outlet has a very rapid fall, thus affording a rare opportunity for the utilization of water power and the development of manufacturing industries. It does not appear that the said swamp was caused by any direct overflow or some minor branch of the outlet from a higher level; and as the banks of the stream were above the surface of the marsh, it was assumed by many persons that the swamp was occasioned by the percolation of the water in the stream through its bed and its southern bank into and upon the adjacent low ground. The original outfall for the waters of the wet district is stated to have been a small water-course discharging into the Owasco outlet at a point somewhat westerly of the marsh and where the surface of the stream was at a considerably lower level than immediately at the swamp. This low area has in the course of time been artificially filled up with earth, and its site is now occupied by public streets and buildings used both for business and dwelling purposes. Some of the streets in this district are provided with sewers, in particular, Water street, through which there has been constructed a large outlet sewer at a depth of about twelve feet below the present surface.

But, notwithstanding the existence of these sewers, Dr. Dimon assures me that the subsoil in this area is thoroughly saturated with water at a depth of from seven to eight feet below the present surface, and that in many places the moisture enters cellars and the foundation walls of the buildings, thereby prejudicing the health of the people. His inference is that this condition of the subsoil results from the set-

ting back of the water in the outlet by the prison dam, and that consideration for the public health demands its removal.

The question to be solved is in relation to the origin of the swamp that formerly existed and has since been filled up. From the statements made above, I am led to doubt that the marsh was caused by the percolation of the water in the outlet through its bottom and southern bank; and a brief examination of the geological structure of the hill to the south and west of the outlet sufficed to assign an entirely different source for the water which permeates the subsoil of the Water street district. The hill referred to has upon its northern face gentle slopes which gradually pass into abrupt descents easterly toward the stream. Its higher portions are covered with deep layers of sand and gravel, into which wells have been sunk in many places from twenty to thirty feet in depth for the purpose of obtaining water, and without reaching the underlying shale and limestone rock. A vast volume of porous material is thus at hand to receive and absorb the rain-fall, which filters slowly through the mass until it reaches an impervious stratum; and upon the surface of this stratum the water then flows subterraneously until it has an opportunity to make its way through the superincumbent material, when it manifests itself as a spring. If now it cannot find a ready outfall, it will accumulate, become stagnant and form a marsh. In this manner the Water street swamp district may derive the water saturating its subsoil equally as well as through percolation from the outlet.

But before any conclusion should be drawn, other evidence submitted to me by Dr. Dimon ought to be taken into account. Taking as a datum plane the level of the present surface of the ground at the intersection of State and Water streets, then; first, the ordinary water surface in the outlet behind the prison dam is eight feet below said datum; second, the original surface of the swamp is from seven to nine feet below said datum, or substantially the same as the present water surface behind the prison dam; third, the rock is more than twelve feet below said datum in Water street, since it was not encountered in the sewer excavation through said street, which extended only to hard-pan or shale; fourth, in excavating for the foundations of a building on the west side of State street, between Water street and the outlet, a hard bottom of either rock, shale or hard-pan was found about seven feet below said datum, or about one foot above the water surface of the outlet behind the prison dam; fifth, that the original swamp is sharply defined in excavations of sufficient depth by a stratum of dark muck from three to four feet in thickness, which rests upon shale, hard-pan or stiff clay. To the foregoing we may also add that the original bed of the outlet through the city is in general rocky, as may be seen at numerous places where the stream falls in cascades and rapids over limestone ledges varying in height and thickness.

A careful consideration of the foregoing evidence alone, without having at hand facts relating to the case which can only be obtained from long continued and rather expensive examinations, leads me to infer, that the cause of the original swamp and the present saturation of the subsoil in this district should be sought in the water which is stored up in the porous soil of the large hill after every rain-fall, and which finds its way along some impervious stratum down the northern slope into the low ground mentioned; but in order to decide the ques-

tion definitely, I recommended to Dr. Dimon that a series of borings be made at a number of convenient points in the swampy district, and that pipes two or three inches in diameter be inserted into the holes thus made, so that the elevations of the subsoil water level standing in these pipes can be obtained at various times and under varying conditions. By comparing the data derived in this manner with each other, and with the water level in the outlet behind the prison dam, a sufficiently accurate knowledge of the character of the earthy strata overlying the shale, hard-pan, or rock in the locality, together with a satisfactory solution of the course of the subsoil water, may be economically secured. Accordingly, before any steps are taken for the removal of the prison dam, whereby a valuable water privilege belonging to the State and affording considerable power for driving machinery in the prison would be destroyed, I would advise that a thorough investigation of the nature just indicated be made.

The fact that the deep outlet sewer through Water street does not now drain the sub-soil sufficiently for sanitary considerations is no evidence that extensive percolation takes place through a large volume of embanked earth from the outlet. It appears that this sewer was built with exceptional care, and that every precaution was taken to render it water-tight. Under these conditions it is easy to comprehend why it cannot operate as a drain any more than the cast-iron distribution pipes of the water-works system. Porous walls or a sufficient number of openings into the conduit are essential to *drainage*; whereas for the conveyance of *sewage*, absolutely water-tight pipes and other structures are generally recommended by engineers. The Water street sewer has apparently been built upon the latter plan without reference to the admission of the sub-soil waters, and hence the complaint that the cellars are damp and unhealthy.

To remedy this condition of the soil, drains are required instead of sewers; and to advise in what manner such drainage can be effected with the least reasonable expense necessitates the collection of the data recommended above to be procured, since it might, perhaps, be found advantageous to intercept a portion of the sub-soil waters at other points than in Water street.

Relatively to the subject of the pollution of the Owasco outlet by the sewage of the city, as submitted by Dr. Gerin, I would prefer to hear what evidence the health authorities had in their possession before venturing to express an opinion; and I regret greatly that on the day appointed for my investigation, the misunderstanding already referred to prevented me from meeting Dr. Gerin and his associates. Before proceeding further in this matter, therefore, I will await your instructions.

In conclusion, permit me also to express my indebtedness to Mr. Chas. L. Sheldon and Dr. Dimon for many courtesies and the data stated above.

Respectfully submitted,
EMIL KUICHLING,
Civil Engineer.

It is worthy of notice that the village of Batavia sought from the last Legislature the passage of an act permitting it to apply for the

appointment of a commission whose duty it should be to cause the necessary surveys and plans for a system of sewers, to be prepared and laid before the citizens for consideration and final approval; but it is to be regretted that the bill was introduced too late in the session to have been made a law. The city of Hudson, also, is deserving of great commendation in having acted promptly upon the advice of the Board, and secured the services of a competent engineer, who, in conjunction with its city engineer, presented to the mayor and common council a well-devised plan for the sewerage of the southern half of the city.

[G.]

REPORT ON PREVALENT DISEASES.

Diphtheria.

This disease has continued to be one of the most annoying and destructive of any which afflict families in this State. It is, in the worst sense, a domestic pestilence; and the sanitary warfare against it has to be waged as against a subtle enemy of the household wherever it may make its appearance. No family or group of children is safe for an hour in the presence of a patient with diphtheria. This view of the danger that lurks wherever an outbreak of diphtheria occurs is based upon something more than the mere possibility of the infectiousness of the contagion that may spread from the sick person; for wherever there is an outbreak of this sickness, there is presumed to be some factor of causation not less important than that which may inhere in the infected particles or emanations from the sick.

It is not a theory or hypothesis which health officers and medical practitioners are dealing with, when they proceed to direct that the well shall be entirely separated from the sick, and that even attendants upon the latter shall also be separated from children and ordinary personal intercourse with households. It is plainly a matter of fact that is thus being recognized and provided against, under sanitary rules; namely, the fact that by some means and particularly by the breath or exhalations from the mouth and nostrils, an infecting cause of this specific malady is most liable to be communicated to other persons in the sick-room and to those who are exposed to the utensils, towels and clothing taken from the sick one.

Whatever be the separate and combined physical factors concerned in the causation of diphtheria, the practical sanitary lessons taught concerning the causation and means of prevention of this malady are not difficult to learn or obey.

In the first two annual reports of this Board, the record of current events in the sanitary care of diphtheria received some attention, and awakened great interest throughout the State. In this report the statements shall be as brief as possible, and the facts given will doubtless be estimated at their proper value.

As shown in the text of the Board's report this year, the total number of deaths from diphtheria in the cities of New York and Brooklyn in 1881, was 3,410, or about six per cent of the total mortality. At this rate, were the disease as prevalent in all parts of the State as in those two cities, not less than about 6,000 deaths were caused by this disease during the year. Though the statistics are not yet before us for the entire State, it is believed that about 5,500 deaths occurred form diphtheria during the year 1882.

Diphtheria in Canajoharie, Palatine and other places in the Mohawk Valley.— For months, in 1881, the Mohawk Valley was almost constantly afflicted by the presence of this disease. During the past two years, it has been necessary to inquire into some of the causes, which may be mitigated or prevented.

The following statement relating to the two special causes found to be in operation in the old town of Palatine will not surprise those who are familiar with the practice therein stated, concerning the morbid and unreasonable exhibitions, by which the living expose themselves needlessly to the dead and to the unhealthfulness of apartments in which the remains of the dead are laid for two or three days ensuing after death. A town health officer writes :

"I have waged a sanitary warfare against exposure to the sick in this disease ; but up to the last few cases, isolation of the sick has been an utter impossibility, owing to the stubborn opposition of the family. The dwellings as a rule have very bad sanitary surroundings, and their school-houses are no better. Barns are located on ground from two to thirty feet above the dwellings, barnyards left in the most filthy condition two-thirds of the year. Cellars are wet and undrained. Hog-pens in close proximity to dining-rooms and family wells. Privies uncleansed, some for as long a period as ten years. The subsoil, slate and surface water and often the privy drainage and barnyard soakings run into the wells used for culinary and drinking purposes."

To the great credit of the religious teachers in that region, we are able now to testify that upon being informed by the State Board of Health that the practice of visiting infected sick rooms under the guise of religious and filial sentiment should be regulated or prevented, they have successfully exerted their influence as requested to prevent these evils ; yet among the inhabitants that have never for generations given heed to sanitary regulations concerning malignant diseases, the sanitation of sick-rooms, and the remains of the dead, it is natural to find, as we do, that there are numerous causes which tend to perpetuate the infectious attribute of diphtheria in the regions here mentioned.

It is not doubted that along the rich bottom lands of the Mohawk and its affluents there may be local causes inhering in the soil favored by certain conditions of the atmosphere, which aid in perpetuating the prevalence of diphtheria, but this is something yet to be proved, if it is true. Already within a period of eighteen months the prevalence of this disease has been measurably repressed.

Palatine.—"*P. S. & R. Group.— Three neighboring families.*— Anna P., aged 14, daughter of a farmer residing in Palatine, attacked December 26, 1881. The sanitary condition of premises bad ; damp

cellars, poorly drained about the house ; surface water running into well.

" Mr. and Mrs. P., parents of Anna, contracted same disease December 29. Mrs. S., a neighbor, who nursed the sick in Mr. P.'s family, was attacked January 1, 1882. A sister of Anna P. was also prostrated January 7, and suffered dangerously.

"A daughter of Mr. R., another neighbor, who was constantly in communication with the P. family, came down with the same disease January 16 ; on the 5th of February her sister, and on the 25th and 26th, her father and mother were attacked and suffered severely. This group of nine cases occurred within a period of two months.

" *Second or S. Group.* — A child, 9 years of age, was attacked April 11, 1882. The house had unclean surroundings. The physician in attendance reports that within five years there had been four outbreaks of this disease in that house. April 12, another child in the same family was attacked; April 13, a third, and April 14, the mother herself. On April 20, the nurse and a young man helper, twenty-six years of age, came down with a severe attack. The children in these families were kept from school for two weeks following the recovery of the last case. The physician in attendance says : "I am fully convinced that among the rural population, local causes play a very important part in the production of this disease; and also that where the disease manifests itself in a family from a local cause, that if the first one taken down is properly isolated from the rest of the younger members of the family, and put upon a proper prophylactic treatment, the disease can then and there be arrested, nipped in the bud. I have long noticed that where the disease originates from local causes, the constitutional symptoms are much more prominent in the commencement of the cases than they are in those who catch the disease from exposure to them but have been living under better sanitary surroundings. In these latter, the throat symptoms are more prominent in the beginning."

Schuyler Lake.— The secretary of the board of health of the town of Exeter, Otsego county on the 25th of April, 1882, reported that in the hamlet of Schuyler Lake, three cases of diphtheria occurred, two proving fatal, on the 21st and 22d of that month. The health officer reported that crowded public funerals were held, and that people came to attend them distances of seven miles, from all the country round about. The local conditions that promoted this fatal outbreak were promptly removed, and orders were given for the enforcement of the necessary sanitary regulations.

In Patterson, Putnam county.— During the month of July a case of diphtheria occurred in an uncleanly dwelling-house, where three children died in rapid succession. In a neighboring family that was in constant communication with the sick family one fatal case occurred. The first dwelling was required by the town board of health to be renovated, and among other things it was directed that the cellar, which was in a dangerously foul condition, should be cleansed and filled with fresh earth.

Canajoharie. — In Canajoharie several cases of diphtheria occurred, late in the autumn of 1882. There were five distinct centers of the disease. The cases were isolated and the premises so cleansed

by the health officer, Dr. Simmons, that the spread of the malady was effectually repressed.

Glenville.—In the north-western border of Schenectady county there was an outbreak of diphtheria in September and October, 1882, which threatened much harm until the local authorities brought sanitary regulations to bear. It appears that the outbreak commenced among families in the eastern part of the town of Amsterdam, Montgomery county, and gradually extended eastward from family to family, and, as now seems probable, aided by the attending physician, who says in reporting the cases: "The fact of contagion seems probable, and in two families it is clearly made out; but before the disease ceased to spread the contagious connection ceased to be traced."

Schroon and other mountain towns in Essex county.— While diphtheria proved to be nearly extinguished along the northern border towns of Essex county, where it had been very fatal in 1881 and the beginning of 1882, it prevailed fatally in the mountain towns of that county at various places, and the board of health of Schroon deemed it necessary to adopt strict sanitary regulations to prevent the further spread of this disease in and near the village of Schroon Lake. The result of the effort has seemed to be entirely successful.

Salamanca.— In two successive years, diphtheria appeared in Salamanca under circumstances that threatened much harm; but by timely action of the local board of health its spread is reported to have been successfully and completely controlled.

The local board of health placed in every family a printed page of sanitary rules to be observed, which greatly aided and expedited the good result.

Scipio and Fleming.— Early in the autumn, the health officer of Scipio, after three fatal cases occurred in the neighboring town of Fleming, reported the necessity of action being taken in that part of Cayuga county to prevent the spread of the disease.

Summer Hill.— During the month of October the spread of diphtheria became so threatening that it was necessary for the local board of health to appeal for aid and advice of the State Board, to instruct the people in their duties for preventing the disease.

Walton, Schoharie county.— In September an outbreak of fatal diphtheria was reported in the family of a well-to-do farmer. The first case was of a son just returned from college. He died, and the father who was constantly attending upon him was fatally attacked. Sanitary measures were adopted in the house and in the neighborhood. There was no further spread of the malady.

Amsterdam.— On the night of December 2nd, an emigrant's child died at Amsterdam. The emigrant had left the ship *Gellert*, the day before. The parents had buried one other child at Castle Garden. It has been ascertained that upwards of thirty cases of diphtheria occurred on board the steamship *Gellert* during the passage from Hamburgh. The health officer of Amsterdam reported five cases of diphtheria traced to exposure to this emigrant family. The health officer at quarantine reported that the records of the ship show that there were many deaths on board that ship during the passage to New York.

Broadalbin and other towns of Fulton county.— The physicians and health officers in this county have evinced great interest in sanitary regulations for repressing the spread of diphtheria, though some

of the older physicians have been slow to adopt these measures. The mode of procedure here mentioned by Health Officer Thorne is well-sustained by all intelligent people. That officer writes:

"No public funeral will be allowed, and as soon as practicable the places shall be fumigated with sulphur."

Morris, Otsego county.— At various times the health authorities in the town of Morris, who were first convened and organized in the autumn of 1880 for the purpose of advising and directing the people in the sanitary care of diphtheria, have reported the appearance of this disease, and the procedures of the local board to suppress it. The last of these reports relate to a factory hamlet, a mile and a half south of the village of Morris. Their sanitary orders and procedures have been worthy of imitation.

Diphtheria in schools and colleges.— Though commonly considered an infantile disease, diphtheria is so exceedingly fatal in children and youth and even in adults, and the consequences which may follow in any who survive, are in numerous instances so serious, that it should not be in any case considered a light or unimportant malady.

That great gain to life has been made in the sanitary measures adopted in school districts and in families throughout the State, in regard to the care required to prevent the spread of this malignant disease, begins to be evident. Not infrequently it has occurred that local causes little suspected have been discovered in and about the dwelling-houses, schools, workshops, and in one instance at least in a university building, where under the sanitary advice and prescribed measures of the health authorities, its spread has been prevented. During the past year there has not occurred in the State any such destructive spread of diphtheria through whole townships or villages as was witnessed in numerous instances during the previous two years, and in the judgment of local boards of health the gain in this respect in some of the counties has been justly attributed to the general adoption of regulations based upon the Sanitary Paper known as Circular 13.

The common opinion upon this subject and concerning such evils is entitled to respect, though the causation of diphtheria is incompletely explained. The progress made in this field of medical experience and inquiry must continue to be regarded with intense interest, and the fact already appears that the investigations made through agencies of the National Board of Health into the causation and controllable circumstances of the propagation of diphtheria is regarded with thankfulness by the medical profession and educated classes throughout the country. Researches such as undertaken for the National Board of Health, by Drs. Formad and Wood, should be continued by investigators wherever opportunity is afforded.

Diarrhœal Diseases.

The summer diarrhœa of infants and children destroys such vast numbers in the crowded cities, and in some of the manufacturing villages, that a systematic investigation concerning such causes as are found to be preventable has been commenced. Further reference to the subject in the present report, therefore, need not be made. The record of deaths by infantile diarrhœas in New York and Brooklyn

alone during the four months of the warm season during the past year, and during the previous ten years, present sufficient reasons for investigating the preventable causes of fatal diarrhœal diseases within the State; for though there are localities and classes that suffer little or nothing from these diseases, there are modes of housing and of domestic living which seem inevitably to invite and make certain the presence of this agency of filth and foul air, as the most ruthless of all destroyers of the lives of young children.

Under this head, one of the cases to be reported, for the special instruction it conveys, is that at Knowlesville, in the town of Ridgeway, Orleans county. It was supposed to stand apart quite distinctly from ordinary filth diseases, because it occurred in a community where every household was presumably secure against the common sources of the diseases that are bred of filth. The disease extended throughout the little village without any suspected cause until advice was received from this Board to discontinue using the well waters that furnished supplies to the families in which the sickness was occuring. The President of this Board after visiting the locality concluded that the sickness had a communicable infectious factor by means of the discharges from the bowels, and that the wells or soil had been active agents in propagating the causes of the disease. The well waters were immediately analyzed by Prof. Lattimore, on request of the President of the Board.

The report of the analysis shows nothing more remarkable than the presence of an excess of chlorides, and of the carbonates of lime; * yet several facts are worthy of record here. There were twenty-one cases of dysentery, eight being fatal. The disease was of an obstinate kind, and prevailed rather as a house epidemic than as a general one in the village. In the households which suffered most, the water used for domestic purposes was taken from wells near an open ditch, which had become obstructed and foul. Each of the wells terminates upon the floor of Medina sand stone that underlies the region only a few feet below the surface.

The porous ground was permeated by the offensive ditch-water, and was believed to have become an active contributing cause to the epidemic. A child that had arrived from one of the western States, sick of dysentery, chanced to be domiciled in the house where the disease soon attacked most of the family, in which four deaths occurred. The well of water used by the family, and by those families who next suffered from the same sickness, was found to be the most impure of all the wells in the village, which Prof. Lattimore examined. It is marked in the list of waters examined, as "No. 4, Knowlesville." This well is under the house, and was accused of causing other sickness than dysentery.

The third case of dysentery that occurred was attributed to not only the intercourse with the second case, but to a special exposure to excremental matter from the latter.

From the first three cases, the disease seemed to extend in such manner and to afflict only such persons as the final study of the occurrences presumably warranted the physicians in concluding that there was a communicable factor of causation; and that a specially defiled

*See table of analysis in Report on Water Analysis, p. 100.

condition of the well waters which chemistry certainly has not fully defined, if it has detected it at all, was the most important agent in the causation of the epidemic. One of the wells most feared was closed ; others were cleansed, but it was during a period of drought when the use of such wells was perilous and should have been wholly prevented by substituting a safer source of supply in the neighborhood.

Another instance to be reported is that of an epidemic of choleraic diarrhœa, or winter cholera, which made its appearance in December in the city of Binghamton. The facts thus far ascertained are briefly as follows : Dr. John J. Orton acting for the State Board of Health, with whom this Board associated Dr. H. D. Wey, of Elmira and Drs. Richards, Burr and Putnam of Binghamton for the purpose of pursuing careful investigation into the causation and nature of the outbreak, made a preliminary statement of the facts as follows :

" The diarrhœal epidemic which has prevailed in this city during the past two weeks has assumed the remarkable proportion of affecting, more or less, nearly the whole community.

" The outset of the malady is that of a general *malaise* for a few hours, soon followed by copious watery discharges from the bowels. Some cases are accompanied by great nausea and vomiting ; some with pain in the epigastric region, and in the lower portion of the back and hips.

" There is great thirst; but no increase of temperature ; pulse nearly normal ; skin dry ; tongue in severe cases coated with a heavy white fur ; bowels not tympanitic nor tender on pressure. No deaths to my knowledge have thus far occurred from this epidemic. The duration of the malady is from forty-eight hours to a week. Patients suffer from much prostration.

" The geography of the epidemic must for the present be considered as confined to the city of Binghamton. Although there have been numerous cases occurring in the surrounding country, I have not been able to establish a well-defined case, unless the party had recently visited the city.

" The line of investigation which would most appear to afford a clue to the epidemic would be

" 1. A careful chemical and microscopical examination of the water in the public wells supplying the city.

" 2. The same examination of the water of the Susquehanna river, from which a portion of the supply is taken.

" 3. An investigation to determine to what extent the refuse from tanneries using raw fresh hides, and sewers emptying into the Susquehanna river some miles above the water-works may impair the water for drinking purposes.

" 4. What deleterious emanations may arise from the lower catch basins throughout the city, and what from the refuse of the sewers as they empty into the rivers at their present extreme low-water mark.

" Other lines of investigation will doubtless suggest themselves as we proceed in the work of examining into the causes of this peculiar epidemic. For the present, we can only labor to secure reliable facts regarding it, and await the results of the chemical and microscopic analysis."

The Board requested one of its sanitary engineers, Mr. Kuichling, to join the physicians in their investigations and to report immediately

whatever could be usefully recommended to the local sanitary authorities and the people of that city. Among the facts reported by him the following are especially important in the history of the outbreak.

ROCHESTER, N. Y., *January* 29, 1883.

To the President of the State Board of Health:

* * * * * * * * * * *

"On December 26, 1882, a severe diarrhœal epidemic broke out in the city and affected a large number of residents of all classes of people. Strangers visiting the place were also seized with the malady after a short sojourn either in hotels or in private dwellings, and the outbreak could, therefore, not be attributed to defective drainage and other kindred causes, on account of its universality. Suspicion accordingly fell upon the public water-supply, especially in view of the fact that in consequence of a long-continued drought the yield of the wells at the pumping-station had proved inadequate to meet the demands for many weeks previously, and that the pipe leading into the wells from the river had been kept open more or less during this whole time.

Careful investigation by the local physicians fully justified this suspicion, as it was soon demonstrated that nearly every person affected with the prevalent diarrhœa had partaken of the water from the city mains, and that in only a few out of the large number of cases could any other rational cause for the illness be assigned. Measures were, therefore, taken by the water-works authorities to test the question as to the quality of the unfiltered water that was being pumped into the distributing pipes, and urgent requests were made to the citizens to be as economical as possible in the use of the water so that the river connection could be closed and the supply be derived from the two large wells alone. This change in source was at length effected at three o'clock on the afternoon of December 28, 1882; but as the offensive water already in the mains was not at first thoroughly removed, and was, therefore, only diluted with the purer water from the wells, no marked alteration in the health of the community was immediately perceived. In a few days afterward, however, a noticeable improvement became manifest, and on January 10, 1883, the epidemic was practically over, after a run of about fifteen days."

* * * * * * * *

"The pumping station of the Binghamton water-works is located near the eastern boundary of the city, and on the north bank of the river, at a point considerably above the outlet of any public sewer. The ground is here a broad alluvial flat, somewhat below the general level of the city, and extending northerly to the base of the hills and easterly for a long distance. For a depth of about twelve feet below the surface, the soil is loamy; but following this a substratum of fine river gravel, of indefinite thickness, is encountered, which extends throughout the entire low district. The engine-house is built about 120 feet from the low-water margin of the river, and on each side of the structure a large circular well, twenty-five feet in diameter and twenty-two feet deep, has been sunk down into the underlying gravel, so that the bottom of the wells is about seven or eight

feet below the usual low-water surface of the stream. These two wells are lined for their entire depth with a wall of stone-work, laid up with water-lime mortar, and coated with a suitable layer of cement, and they are furthermore connected together at the bottom by a small masonry culvert. It will, therefore, be seen that the water in the wells comes only from the stratum of gravel and that its level is the same in both.

* * * * * * * *

"Soon after the establishment of the water-works, however, the demands for consumption became greater than the yield of the wells in dry seasons, and the attempt was made to increase the supply by driving a series of iron tubes, varying from 1½ to 6 inches in diameter and from 8 to 28 feet in length, down into the gravel bottom of the two pits; but as the quantity still continued to be insufficient in cases of emergency, a direct communication with the river was made about eight years ago by means of a 14-inch iron pipe, which extends from the culvert connecting the two wells out into the middle of the stream, and is provided with regulating valves for governing the quantity of unfiltered water thus admitted. The plan was to make use of this pipe only in cases of extreme necessity, such as when a large additional volume of water might be required quickly for the suppression of fires, or in times of unusual drought; but as has already been mentioned, the pipe was used to furnish a supplementary amount continuously for several weeks preceding the outbreak of the epidemic. The water thus obtained is pumped by steam power directly into the net-work of iron distributing pipes without any subsequent treatment whatever, and is taken therefrom by the consumers, the majority of whom are unprovided with private filters; so that the most of the water used for drinking purposes in the city, while the direct connection pipe remains open, is merely the river water diluted to some unknown degree with that which percolates through the gravel.

* * * * * * * *

"Proceeding up the river we find within a distance of about two miles from the pumping station of the city water-works the following sources of pollution: 1. At a distance of nearly one-half mile a sewer from the Susquehanna Valley Orphans' Home; 2. At a distance of about one and one-half miles a privy used by the engineer and firemen of the pumping and steam-heating station of the insane asylum; 3. At a distance of about one and seven-eighth miles the partially filtered sewage from the asylum buildings on the hill above; and 4, the presence of large quantities of eel-grass and fresh-water algae in the channel of the river for nearly a mile in length in the vicinity of the asylum pumping station, and along the shores farther down. These various sources of defilement will now be considered in the order stated above.

The Susquehanna Valley Orphans' Home has at the present time 120 inmates, consisting of 108 young children and twelve officers and attendants. It is supplied with water from the city mains through a special pipe, and is provided with two water-closets, which are used daily by about twenty-eight persons, the children ordinarily using an outside privy. This latter is built over a tight masonry vault, which can be connected with the general sewer from the main building by

removing a plug; but from the statements of the superintendent the plug is kept in place and the solid contents of the vault are removed by manual labor about once per year, and used as a fertilizer upon the garden lands belonging to the institution. After the vault has been emptied in this manner, however, the connection with the sewer is opened, and the vault is then thoroughly flushed out with water, which runs off through the sewer into the river whereupon the plug is again replaced. This annual cleaning is undertaken only during floods in the stream, so as to avoid defiling the city's water supply with these filthy scourings. The sewer is constantly used, nevertheless, for the removal of all the common kitchen laundry and water-closet wastes of the establishment, and it discharges its contents upon the sloping bank of the river near high-water mark, so that in dry seasons a large mass of organic filth accumulates on the shore and is swept away by freshets. It may also be mentioned that a number of cases of epidemic diarrhœa occurred among the children and the attendants, but they were all quickly relieved by the administration of common household remedies.

* * * * * * * * *

"From the foregoing it is now manifest that the specific cause of the recent epidemic in Binghamton should be looked for in the water of the Susquehanna river, since within the comparatively short space of two miles above the inlet to the city water-works, four distinct sources of pollution have already been pointed out. But in addition to these direct and constant defilements, we must also take into account the accumulations of organic matter in various forms and conditions which collect during seasons of drought; first, upon the rocky bed and margins of the asylum gully and on the river shore in its vicinity; second, upon the stems and leaves of the dense mass of eel-grass described above; and third, upon the bank and shore of the stream at the mouth of the sewer from the Orphans' Home. All of these accumulations are probably detached and washed away from the places where they have been lodged during a heavy rain-fall and a consequent slight rise in the river, so that at such a time the constant pollution of the water may be largely increased for a short period. In view of these considerations, the fact is now worthy of special notice that after a severe drought continuing throughout the entire autumn, a rain-storm, accompanied with a slight freshet in the river, did actually occur at Binghamton a few days before the outbreak of the epidemic; and it is, therefore, highly probable that the water of the stream was then charged with a much greater amount than usual of organic matter, and that the impurities were accordingly pumped into the city mains."

Respectfully submitte

EMIL KUICHLING,
Civil Engineer.

The Binghamton sickness terminated during the early weeks of the present winter, without any fatal results so far as can be ascertained. The causation of the epidemic, however, is still under investigation, because it was ascertained, before the sickness had ceased, that at various places in the Chemung and Susquehanna valleys, and as far

southward as Towanda, Pennsylvania, and as far westward as Steuben county, physicians report the same kind of obstinate and prostrating diarrhœa which they were unable to trace to any cause. Therefore the committee that began to investigate at Binghamton has continued its work, and will be aided by Dr. Wey as a microscopist and naturalist, and by Engineer Kuichling.

Several samples of the public water supply of Binghamton have been analyzed by Prof. Tucker in the course of this investigation, and he reports that they are of fair purity, and "that the analysis does not furnish any evidence to condemn the chemical qualities of the water."

The long-continued drought is believed by the reporters to be an essential factor in connection with the causation of this sickness; but the particular nature of this factor of cause remains undiscovered. Fortunately, it did not produce fatal effects. Drs. Orton and Wey are to continue their investigations of this outbreak and extensive prevalence of "winter cholera" and report results at a future time.

Typhoid enteric fever.— House epidemics of the filth fever, which is, in the common nomenclature of the people as well as medical practitioners, termed typhoid fever, has been reported in certain instances that are of sufficient importance to require an investigation by this Board. The most troublesome center of this kind of sickness known at present in the State is in and near the village of Amsterdam, which, prior to the introduction of the public water supply, has depended solely upon the surface wells for domestic purposes. Little evidence has been presented that the disease prevailing in this district has any infectious attribute. The polluted well water in all cases, and filthy, sodden grounds surrounding the public yards and the accessories of dwelling-houses, have an obvious and indisputable relation to this sickness.

There has been one instance of house-epidemic in a hamlet near Amsterdam where causes of sickness which jeoparded the lives of all the inmates were investigated with reference to causation, and with the result of finding a condition of dangerous plumbing and drainage which is here briefly narrated.

The epidemic at Indian lake, Hamilton county.— A fatal epidemic of typhoid fever was reported as prevailing, late in the autumn of 1881, in the vicinity of Indian lake, and mostly within the town of that name, and in the north-western part of Warren county. Upon investigation it was ascertained that the fever had proved very fatal, thirty deaths having been reported, and that it belonged to an exceptional class of fevers, and would properly be designated as typho-malarial.

Occurring as it did in one of the most salubrious and favored of the lake districts of the Adirondack wilderness, it was deemed important to determine the nature and extent of this calamitous visitation of sickness. The testimony obtained in writing is in the following terms, and is deemed a correct judgment upon the facts as observed and studied by one of the most intelligent observers among the residents in that region:

"The undersigned, a resident and citizen of said town, respectfully represents that he has resided in said town for the last thirty years.

"That up to and within the last three years this has been a very healthy locality.

"That within the last three years, and more especially the last year, there has been a great amount of sickness in different parts of the town and much suffering from 'malarial fevers,' especially that which is known as typhoid fever.

"That physicians are agreed that a very prolific cause of such disease is the flooding and drawing off the water of Indian lake by means of a dam erected at the outlet of said lake.

"That the water has been recently so drawn off and several hundred acres of lowlands and marshes are left uncovered, causing stench and miasma to the great damage of the health of this community.

"That the dam at the outlet of the lake which is the source of the trouble is directly controlled by parties at Glens Falls, N. Y., and indirectly controlled by Mr. —— of Indian Lake, N. Y.

"That such dam was constructed and has been maintained for many years for lumber purposes, that is, for floating and flooding timber."

(Signed,) W. W. LOCKE.

The following facts were communicated by Health Commissioner Brooks, who inspected the place while on a visit to Blue Mountain, in the town of Indian Lake, after the local board of health had organized.

"Having examined the alleged causes of the calamity complained of by citizens of the town of Indian Lake, in a memorial presented to the State Board of Health on the 11th of September, 1882, stating that serious damage has been caused to the health of the people by the draining off of the waters from the lake, producing thereby sickening emanations from decayed vegetation and dead fish, dangerous to the health of the people; it appears that late in 1881 more than thirty deaths occurred which the petitioners and other observers trace to the causes complained of. The water is drawn off from the marshes in the interest of the lumber trade. There is a flow for lumber for about ten of the fifteen miles along the waters covered by the lake. One effect of this in connection with insufficient or badly regulated dams has been the withdrawal of water from the overflowed borders of the lake, thus contributing to the typhoid and miasmatic fevers and fatal diphtheria which resulted.

"It is believed a new dam could be built which would retain the necessary covering of water over the marsh land now exposed late in summer. The insufficiency of the present dam makes the new work necessary. This would add several feet of water by preventing it from being drawn off in the interest of the lumber trade and at the expense of the public health. What is needed is the proper supply and uses of the water, which is now denied by the improper draught upon it in the hot weather to make a flow for lumber, which in the opinion of the undersigned is not necessary.

"The local board of health and other town officers being fully acquainted with the chief causes of the evil complained of (in whose statement the committee of the State Board concurs), ask leave, preliminary to any complaint to the Governor of the State, to make their statement to the company now controlling the lumber trade of Indian Lake. They do this in the belief that what is asked for ought to be done, can and will be done in the interest of the people who have suf-

fered so much in the past, and who are apprehensive of the continuance of the same evils in the future, if the cause is not at once removed.

ERASTUS BROOKS."

The town board of health of Indian Lake, in its last communication to the State Board makes the following statement:

To the Honorable the Board of Health of the State of New York:

"We, the undersigned, composing the town board of health of the town of Indian Lake, in the county of Hamilton and aforesaid State, respectfully represent to your honorable Board:

"1. That in the fall of the year 1881 and during the winter and spring of 1882 there was a great amount of sickness — followed in some cases by the death of the sufferers — from typhoid fever.

"2. That the physicians who attended and treated the sick were agreed that the direct cause of such disease was the draining off of the water in Indian lake, and leaving several hundred acres of lowlands and marshes uncovered and exposed to the sun in the hot seasons of the year, to-wit, in the months of June, July, August and September.

"3. That the water has been so drawn off in the month of August, 1882, and such lowland and marshes are now exposed to the heat of the sun, causing a disagreeable stench and forming a green scum over the uncovered bottom lands, which physicians declare to be injurious to health and liable to create malarial fevers.

"4. That the dam at the outlet of said lake was constructed by a company having their office at Glens Falls, N. Y., and has been maintained by said company and directly controlled by such company and indirectly controlled by a representative at Indian Lake, N. Y.

"5. That the remedy for the evils complained of is, first, to leave the water in said lake to run its natural course; or second, to draw the water off early in the season and let it run until freezing weather; that is, the 1st of October; or third, erect a dam of sufficient capacity or height to afford the amount of water required with a "trip sill" sufficiently high so as to leave the lowlands and marshes covered with water.

"For the Board of Health of Indian Lake,

"ANGELO TRUESDELL, *Supervisor.*
"C. D. GILSON, *Town Clerk.*
"W. W. LOCKE, *Citizen.*"

Typhus fever. — As shown in the Board's Second Annual Report, true typhus gained access to lodging-houses in the city of New York early in 1881, and as shown in the report upon it by assistant sanitary superintendent, Dr. E. H. Janes, the disease was kept effectually subdued, though it maintained a few lurking-places in lodgings and tenement-houses. In August, 1882, it was discovered that typhus existed in some of the lodging barracks of the Italian laborers on the New York and West Shore railroad. Four deaths occurred in one of those shanties which the coroner certified as having been caused by typho-malarial fever. A few of the sick laborers who returned to the city of New

York from time to time in August and September, arrived either already dead of the fever, or with its pathognomonic signs well marked. It was deemed expedient to make a rapid sanitary inspection along the entire line of the West Shore railroad laborers' lodging-houses, from Haverstraw to Utica. The result of that inspection proved that not more than five centers for the propagation of that disease had been established, and that the contractors and foremen in charge of the laborers would heartily coöperate in the sanitary renovation and regulation of the lodging-houses and barracks occupied by the laborers.

A brief memorandum of sanitary instructions was issued for use whenever it was believed that the typhus contagion was liable to be propagated in any part of the State. The means of exposure were such wherever the railroad laborers were moving, that this mode of giving sanitary counsel seemed very necessary. This is illustrated by the last*, as well as all the earlier cases, reported from the city sanitary authorities to the State Board. The memorandum was in the following words:

STATE BOARD OF HEALTH OF NEW YORK.

Warning against typhus.— The typhus contagion, which is being spread by railway laborers, threatens much harm. The local boards of health in the 326 villages and the 947 towns and 24 cities of the State should require their health officers to be watchful and ready to adopt all necessary sanitary precautions for isolating and controlling this disease at its first appearance. Tramps should not be permitted to enter dwellings and lodging-houses, as they wander about. They should be cleansed and controlled by superintendents of the poor. Sanitary officers should order whatever is necessary. Every typhus patient should be so quarantined and provided for as to prevent the spread of infection. All lodging-houses and dwellings where fever is suspected should be thoroughly cleansed; and wherever a case of typhus occurs the disinfection of the clothing, bedding and sick-rooms should be as prompt and thorough as in cases of small-pox. The sick and whatever pertains to them, as well as the remains of the dead from contagious diseases, must not be removed from one place to another without written permission of all the health boards of the several places.

ALBANY, *Aug.* 30, 1882.

ELISHA HARRIS, M. D., *Secretary.*

The following extracts from reports of medical inspectors at the time illustrate the situation of affairs with which the Board was then dealing. Dr. Govan, of Stony Point, under date of September 4, writes:

*DR. E. HARRIS, *Secretary State Board of Health:*

DEAR DOCTOR — Michael Rona, an Italian, came down from Cornwall by rail last night and died in the Chamber street ferry-house. I learn that he was employed on the West Shore road, but can find nothing else about his history. The man who came down with him I have not been able to find. Rona had an eruption. Petechial, on the abdomen, thorax and arms and probably died of typhus fever.

Respectfully,

WALTER DE F. DAY, M. D.,
Sanitary Superintendent.

"DEAR DOCTOR — In compliance with your commission I have inspected all the lodging-houses and shanties occupied by the laborers on the proposed railroad, from the north line of our county south to the old Conger Mansion in Clarkstown. In all I found thirty-two lodging places in Stony Point. Seven were occupied, packed with Italians in a most filthy and abominable condition. Many, if not all, had no outhouse, and surrounding one I found the ground for acres around almost covered with human manure. The houses had no chimneys, fire on the middle of the floor and smoke going all around. The stench was overpowering. Six of the shanties were occupied by colored men, and were but little better than the others. The men slept on old rags, without beds, pillows, or even straw."

Dr. Curtis reports on the 5th of September:

"I have spent three days inspecting from Little Falls westward. None of the lodgings are clean, all are full of litter, many are filthy, some indescribably so. Many are newly-constructed buildings of the roughest character, others are outhouses hired of resident farmers, or old disused dwellings. The latter are usually by the roadside, the new structures being, as a rule, remote from the resident population. In these they are packed very closely, more than one hundred men often occupying a building twenty-five by forty feet in size. The habits of the lodgers are exceedingly filthy. Latrines if provided are seldom made use of. Refuse and slops are deposited indiscriminately about the surroundings of the house. Food is mostly of flour manufacture, maccaroni, bread and a little bacon. The cooking is of the most primitive character. Water is obtained from neighboring wells or creeks. There appears to be comparatively little sickness amongst them. They are generally inoffensive and law-abiding and are faithful laborers as a rule. In all sanitary respects they improve on residence for a season in this country. Their characteristics as observed along this line of the road are quite the same as noted in the vicinity of Albany and down the river to Catskill. On the West Shore line the contractors and division superintendents report between 5,000 and 6,000 Italian laborers at present employed through the central part of the State."

The occurrence of typhus in a charity lodging-house of the better kind in East Twenty-eighth street, New York city, justly awakened great interest in results that would follow the prudent dispersion of the crowded inmates of that place and the sanitary care of them at the new hospitals on the North Brothers' Island. The prompt action of the municipal board of health in thus disposing of nearly a hundred children and their devoted caretakers, the Sisters of St. Stephen's Home, will warrant a report of the results, at a future time, by this Board. It is already known that the sickness has ceased, and that none of the children have died, though some of the sisters have.

An example of results, following sanitary inspection to discover causes of prevailing sickness.— Infections of the kind from which children mostly suffer, namely, scarlet fever and diphtheria, had been for many months reported as being obstinate and as continually reappearing in different parts of the village of Pleasantville, town of Mount Pleasant, Westchester county. The health officer of the town, Dr. De Hart, at the suggestion of this Board successfully undertook to

trace out, with minute carefulness, the conditions under which these and other preventable diseases prevailed in the different households. The following are some of the noteworthy points: The faults of domestic hygiene are first in order. Second, the obstruction and consequent backing up of the water in the natural water-courses throughout the built-up portions of the village, chiefly the result of filling across and grading up, without culverting, the small natural streams and water-beds, which had their course outward into the Saw-mill river. The filling up of that river with silt and debris in the vicinity of the village; wet cellars and considerable swamp and water-soaked grounds in and near the village.

A careful inspection was made of 90 family dwellings, wherein were found 441 inhabitants, 265 of whom were found sick. The town health officer has submitted the following tabulated statement, showing the condition of each house in which sickness was found to prevail at the time of inspection:

Tabulated Exhibit of Sanitary Inspection.

House number. Street and names of occupants omitted.	Number of persons in family.	Number sick with miasmatic fever.	Source of water supply.	Direction of house from swamp ground.	Observations.
1	4	2	Spring n. dep't	South ...	House near swamp.
2	5	2	Same as No. 1	South ...	In a house till recently long unoccupied.
3	5	4	Same as No. 1	South ...	First story of house No. 2.
4	4	1	Same as No. 1	East.....	A case of remittent.
5	5	3	Rain	West	On crest of ridge; cellar wet.
6	6	1	Rain	West	Same as house No. 5.
7	4	3	Rain	West	Cellar of house Nos. 5 and 6.
8	4	1	Rain	West	Cellar, same house as Nos. 5, 6, 7.
9	4	1	Rain	West	Cellar, same house as No. 8.
10	4	3	Rain	East.....	Wet grounds about dwelling.
11	5	2	Rain	East.....	Wet basement and grounds.
12	4	4	Rain	East.....	Wet basement.
13	5	2	Rain	East.....	Wet basement on made ground.
13½	2	1	Well	East.....	Second floor of No. 13.
14	2	1	Well	East. ...	Wet grounds about dwelling.
15	3	2	Well	East.....	Same house and floor as No. 14.
16	2	2	Well	S. East .	Made ground and wet.
17	7	3	Well	E. & W..	Made ground; saturated from privy.
18	4	None	Well	E. & W..	Second floor of No. 17.
19	2	2	Cistern	E. & W..	House filthy.
20	3	1	Well	W. & N..	Grounds saturated; densely shaded.
21	4	1	Well	N. & S. .	Grounds 30 ft. higher than No. 20.
22	3	2	Well	N., S. & E.	.....
23	5	3	Well	N., S. & E.	Low, wet and shaded.
24	32	8	Well	N., S. & E.	Dense shade; 30 boarders.
25	5	4	Well	N., S. & E.	Dense shade; wet grounds.
26	6	None	Well	N., S. & E.	.....
27	6	None	Well	N., S. & E.	On bank of river.
28	3	None	Well	N., S. & W.	.....
29	4	3	Well	South ...	Swamp in front.
30	2	2	Well	South ...	Same as house No. 29.
31	5	4	Sp'g on h'way.	W. & N..	.....
32	2	0	Sp'g on h'way.	W. & N..	Third floor of No. 31.
33	6	6	Sp'g on h'way.	W. & N..	First floor of No. 31.
34	2	2	Sp'g on h'way.	North ...	Swamp at the rear.
35	5	3	Sp'g on h'way.	North ...	Swamp at the rear.
36	2	None	Spring, clear.	N. & W..	.....
37	6	5	Well	N. & E...	Dense shade; swampy.
38	2	2	Well	N. & E...	Dense shade; swampy.
39	4	3	Well	N. & E...	Dense shade; swampy.
40	2	2	Well	N. & E...	Dense shade; swampy.

Tabulated Exhibit of Sanitary Inspection — (Continued).

House number. Street and names of occupants omitted.	Number of persons in family.	Number sick with miasmatic fever.	Source of water supply.	Direction of house from swamp ground.	Observations.
41	2	2	Well	N. & E...	Dense shade.
42	7	7	Well	North ...	Surrounded by swamps on all sides; dense shade.
43	6	6	Well	North ...	Swampy; drainage bad.
44	6	4	Well	North ...	Swampy; water-closet drains to well.
45	2	None	Well	North ...	Swampy.
46	3	2	Well	North ...	Swampy; water-closet offensive.
47	6	None	Well	North ...	.....
48	5	3	Well	North ...	Swamp in rear.
49	4	4	Cistern	E. & N..	Swampy; water-closet in house; natural drainage bad.
50	..	..	.....	E. & N...	Same as No. 49.
51	2	1	.....	E. & N...	Same as No. 49.
52	4	None	Well	E. & N...	Swamp and pig-pen in rear.
53	8	3	Well	E. & N...	Swampy; front and side sandy soil.
53a	7	4	Well	E. & N...	Same as No. 53.
54	9	7	Well	E. & N...	Cellar low; swamp S. & W.
55	5	2	Well	E. & N...	Swampy and low.
56	4	2	Well	East.	Swampy; water in cellar.
57	4	2	Well	East.....	Second floor No. 56.
58	6	2	Well	East.....	First floor rear No. 56; water-closet 12 ft. from house in filthy state.
59	3	3	Well	East.....	South end of large house.
60	5	..	.....	East.....	Defective sewerage, north end; 2 deaths.
61	..	..	.....	East.....	.....
62	3	2	Cistern	East.....	Swampy land.
63	2	2	Well	W. & N..	Swamps to the east; 1 death.
64	4	3	Well	W. & N..	First floor and basement of No. 63.
65	2	2	Cistern	W. & N..	Second floor.
66	6	6	Well	W. & N..	First floor; swamps east and south.
67	4	4	Well	W. & N..	Well lower than house.
68	1	1	Well	W. & N..	North end of No. 67.
69	8	7	Well	E. & W..	Ice pond in front; well lower than house; house lower than No. 66.
70	4	1	Well	E. & W..	Lower than 66; ice pond in front.
71	3	3	Well	N. & E...	Ice pond in rear.
72	5	5	Well	N. & E...	Pond No. 1 at rear.
73	8	8	Well	N. & E...	Pond No. 1 at rear.
74	4	1	Well	West	Swamp in front.

Tabulated Exhibit of Sanitary Inspection — (Continued).

House number. Street and names of occupants omitted.	Number of persons in family.	Number sick with miasmatic fever.	Source of water supply.	Direction of house from swamp ground.	Observations.
75	4	1	Well	West	Same as No. 74.
76	6	2	Well	West	Same as No. 74.
77	5	5	Well	E. & N...	.....
78	30	23	Well	N. & E...	Swamp E., N. & W.
79	7	7	Well	N. & E...	Basement; Saw-mill river on south; 1 death.
80	6	6	Well	N. & E...	Same as No. 79, second floor.
81	3	3	Spring	E., N. & S.	Swamp land about house; 1 death.
82	6	6	Well	E., N. & S.	Same as No. 81.
83	4	1	Spring.....	E., N. & S.	Swampy; 1 death.
84	3	1	Well	E., N. & S.	Water from well No. 86.
85	7	7	Well	E., N. & S.	One death; water from well No. 86.
86	3	3	Well	East....	Side hill; well lower than house.
87	3	3	Well	E., N. & S.	Second floor; use well of No. 86.
88	4	3	Well	E., N. & S.	First and second floor No. 87.
89	4	3	Well	E., N. & S.	Boggy land under house; well lower than barn and water-closet.
90	4	1	Well	E., N. & S.	Water from spring No. 91.
Total .	441	265			

NOTE.— No. 91. A public spring (No. 1), Washington avenue, east side of highway; gets drainage from livery-stable; used by ten families; mostly surface water; rich in chlorides.

No. 92. A public spring (No. 2). Road to Sing Sing, side of highway; gets drainage of same. In line of natural water-course; supplies eight families.

No. 93. Public spring (No. 3), rear of No. 81 South street. In swamp; entirely surface and subsoil water; supplies two families.

No. 94. Private spring (No. 4), Harlem railroad; supplies tank-house and trough pipe, which may leak, thus soaking territory near 5, 6, 7, 8, 9.

No. 95. Pickle house (No. 1), Marble avenue, large swamp on north, natural drainage good, empty brine in swamp, lying on easterly side of Saw-mill river.

No. 96. Pickle house (No. 2), Rebecca avenue, 150 feet from dwelling; drainage from same under Harlem depot to Saw-mill river.

No. 97. Artificial pond (No. 1), South street; ice pond made by springs and surface-water; vegetation rank; outlet choked; not emptied in spring; several years' old.

No. 98. Artificial pond (No. 2), Tompkins avenue, recently constructed; in good condition; to be heard from at some future time.

No. 99. Private spring (No. 5), Mrs. Mills, in cellar; drainage away from house; no standing water; live up stairs; no sickness.

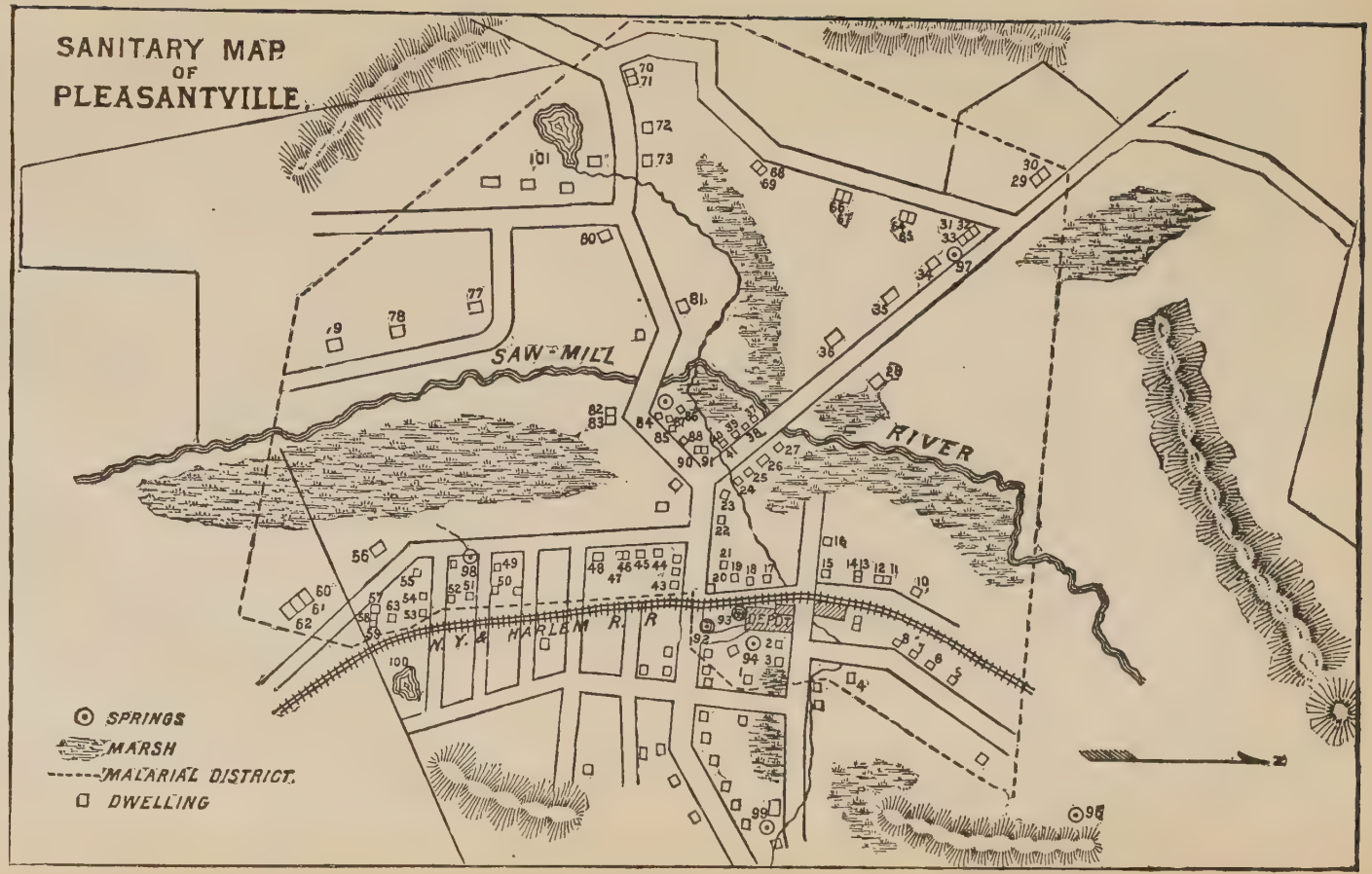
The annexed map shows the village as it lies upon the eastern or left-hand side of the Saw-mill river. The names of streets and of owners of dwellings are omitted, and simply the sketch with its few symbols presented in illustration of the inspector's notes.

In pursuing its work the local board of health sought the assistance of a committee of the State Board, and this was given by Commissioner Erastus Brooks, accompanied by Dr. Alfred L. Carroll, the Board's special investigator in the maritime district. Dr. Carroll briefly reported the results of that visit and conference with the people of the village in the following terms:

"This sparsely settled village is situated in a valley through which runs the Nepperhan or Saw-mill river, a small stream which constitutes the natural drainage channel of the adjoining slopes. Toward this stream tend several minor drainage valleys and water-courses, sufficient, if properly conserved, to relieve the soil. The geological formation is dolomite, thinly covered with drift, and, on the higher parts of the slopes, often quite bared, so that surface-water must descend rapidly upon the lower land. Moreover, several springs emerge from the side hills, adding their quota to the burden of soil-water. In the lower land a layer of "hard-pan" is found at about three feet below the surface, the impenetrability of which prevents downward soakage and necessitates increased care in preserving the natural descents. The level of the ground-water, as shown by wells in this part of the village, is about five feet below the surface, and is subject, as I am informed, to rapid and considerable fluctuations. Drinking water is obtained partly from public springs, in a few instances from rain-water cisterns, but chiefly from surface-wells in suspicious proximity to leaching cess-pools and privy-vaults.

"In the southern portion of the village, on the eastern bank of the river, lies an expanse of wet meadow, little higher than the level of the stream, which in this part of its course has its water raised and its current rendered sluggish by alteration and obstruction of its channel further to the southward. Nearly parallel to the river runs the Harlem railway, with much filled-in ground along its track, materially impeding the drainage of the eastern slope, and with insufficient culverts or none at all, where it crosses channels or water-courses. Finally, in several instances, faulty grading of streets interferes with the off-flow of spring or surface-water. The general conditions, therefore, are such as to favor soil saturation in the lower lands, notwithstanding the natural facilities for soil drainage.

"The principal etiological factor in the recent malarial outbreak, however, is to be found, I think, in the insanitary domiciliary arrangements throughout the infected district. The houses are built, a few directly upon damp soil, some upon side-hills with three sides of their basements partly or wholly underground, most of them with uncemented foundations and cellars, sometimes deeply flooded and always wet. In several cases, over-flowing cess-pools and privy-pits are


SANITARY MAP
OF
PLEASANTVILLE.
SAW MILL
RIVER
N. Y. & HARLEM R. R.
SPRINGS
MARSH
MALARIAL DISTRICT.
DWELLING
N

dangerously near to, and on a higher level than, these cellars and the surface-wells which supply drinking water to the inmates, and of which a few, hastily tested at the time of my visit, yielded marked evidence of chlorine. In one group of infected houses on the western slope, these domestic agencies are abetted by the proximity of an artificial ice-pond, damming back much of the surface-water, and having at its sides and bottom a large amount of decaying vegetable matter, the level of which, as I was told, is frequently raised and lowered. The soil on the margin of this pond gave a faintly acid reaction. Subsequent examination of it, through "artificial marsh" and successive culture experiments, failed to reveal any micro-organisms resembling the alleged "bacillus malariæ," although it abounded in the ordinary forms of "scavenger-bacteria" and fungus spores.

"Of the public springs, one lies just below a livery-stable, the drainage of which into it is manifested by a considerable admixture of chlorine; another receives a contribution of brine from a neighboring pickle factory; a third is situated on the southern side of the road to Sing Sing, exposed to surface-drainage from the road and from an adjacent house. As dysentery was said to have occurred among the families using this latter spring, I carried home some of the water for more careful examination. It contained (by the permanganate test) 4.5 grains per gallon of oxidizable organic matter, with a trace of chlorine; and after condensation yielded a slight flocculent deposit, consisting largely of decayed vegetable matter. There were also present numerous diatoms, confervæ, free-swimming zoospores, mycelium-threads and myriad spores of two species of fungi; bacterium termo in great abundance. Most suspicious of household waste was the appearance in one field of the microscope of an indigo grain and an epithelial scale. Indeed, as the spring is arranged — with a sunken barrel, below the level of the road-bed and the surrounding earth — it can hardly escape occasional pollution.

"To account for the unusual outbreak of malarial fevers this autumn, as contrasted with the comparative immunity of former years, it is to be considered that during a prolonged drought the soil upon the higher portions of the slope may have accumulated a freight of organic matter from leaching cess-pools and various other sources, which by the subsequent excessive rain-fall was rapidly borne down upon the lower land of the infected district, adding its burden to the already over-taxed capacity of the latter region.

"The public defects above noted need few and simple remedies. The restoration and preservation of the natural drainage courses, involving the construction of adequate culverts where the railway obstructs them, would in most places suffice to unload the soil toward the river; and clearage of the channel of the latter in its southern part would, by lowering its level and facilitating its flow, relieve the lowest land along the margin. How these ends may best be attained is an engineering question, to be left for consultation between your Board and the local authorities.

"The domiciliary conditions, which I regard as of greater importance, open a more difficult problem, embracing the relations between landlord and tenant, and the question of the proper disposal of refuse. Several of the houses which I examined, I should not hesitate, in

their present condition, to condemn as unfit for human habitation — some through inherent defects of site and construction, others through lack of sub-soil drainage, which would entail an expense disproportionate to the rental obtained for them. As population increases the multiplication of cess-pools and privy-pits in such a soil must add to the dangers of soil-saturation, and ultimately induce filth-diseases as well as those of paludal origin. Already some of the more intelligent citizens have adopted the dry-earth or ash system with shallow and often-emptied pits, and the cremation of kitchen refuse; but here, as elsewhere throughout the country where water carriage of sewerage is impracticable, a general reform in the methods of conservancy is of essential moment for public health.

Respectfully submitted,
ALFRED L. CARROLL, M. D.
Inspector."

November 12, 1882.

[H.]

REPORT ON REPRESSING AND PREVENTING CONTAGIOUS DISEASES.

This duty has proved to be publicly acceptable as well as important throughout the State. The general statute for the preservation of the public health has given to all local sanitary authorities ample power and discretion to adopt the requisite means for protection against the sources of known danger and for providing for the sick; and experience thus far indicates, that the households and communities in which this class of sanitary measures have to be adopted are usually willing to assist and co-operate with health officers. Not only as regards the general cleansing, ventilation and drying that may be required in and about the house where any of the spreading diseases are found, but as respects thorough disinfection of materials and premises, and most important of all, the isolation and special sanitary care of the sick, have the families and health officers acted with greater effectiveness and unanimity than had been predicted. To secure precautionary attention to small-pox is easy, but it was, at first, by no means certain that such sanitary precaution would be successfully adopted in the care of diphtheria, scarlet fever and the fevers that are reputed as infectious.

The once common and yet lingering disbelief that diphtheria and scarlatina are infectious, and properly subject to isolation and disinfection, and the still more common belief that by some fortunate kind of oxidization and dilution of the infectious matter or *contagium* of any of these maladies their operation as *virus* to propagate the same disease may be overcome and prevented, had to be, and may still for a time have to be, met by health officers; yet, in the vitally important and responsible work of these officers and the local health boards, the dilution of contagious matter is not to be regarded as the destruction of

or the antidote for it, the safe course being to regard the chief if not all of the contagions and infections as germinal and self-propagating, by means of particular attributes that can be controlled or destroyed just in proportion to the exact knowledge we have of these germinal attributes and the accessory factors of causation, as regards the diseases respectively. The State Board of Health has steadfastly promulgated this view of the reasons and the duties relating to the various contagious maladies, and therefore has placed in every school district in the State as well as in the hands of all local health officers, the Sanitary Papers, 13, 14, 15, 16, 38 and 41, relating to this subject.

Since the local boards of health became sufficiently organized to undertake to give full effect to the statutory provisions concerning the preparation of temporary hospital refuges for the sick with acute contagious disease, this Board has encouraged and aided such resort to hospital care as well for the recovery of the sick themselves as for repressing the spread of disease. The preparation of certain most available plans and estimates for contagious disease refuges and temporary hospitals was ordered, as described in the diagrams here annexed.

The great interest which has been awakened in recent demonstrations and evidences — more or less complete — as to the particular nature of contagions or the infective germinal agents in the maladies hitherto known as infectious, and, still more, concerning the most destructive of common pulmonary diseases, is certainly resulting in a most beneficent kind of care-taking of the sick and the households which suffer from any of these diseases. And, fortunately, the sanitary and medical facts and duties concerning these matters are so set forth by the medical authorities who have any proper comprehension of them, that they induce the most devoted attention to the welfare of all sufferers and exposed persons, instead of that kind of alarm and anxiety which opposition to, and ignorance of, these truths and the sanitary duties are prone to cause. Observation already proves that the tranquillity and safety of households, schools and neighborhoods, as well as the excellence of care of the sick and the probabilities of least fatality are alike enhanced by the best knowledge and uses of these facts relating to the nature and laws of infection. Truth is a tranquillizer, and is ever saving.

The domestic separation and quarantine of the sick.— The current publications issued by this Board, numbered 13, 14, 15, 38 and 41, relate exclusively to the sanitary measures for preventing the spread and fatality of infectious diseases. The precise methods and principles of procedure to be observed by local sanitary authorities and medical attendants in relation to cases of these maladies, as now advised by the State Board of Health, are set forth in papers known as 27, and 27 *a* and *b*, and found in the Second Annual Report, pages 406 to 414. To these principles and methods we would adhere. They are readily adopted, effectual and economical. In regard to them and to all the procedures for removing and preventing the causes of infection, we "must be careful to do the sick no harm," but more than this, must do every thing to make the place where they are "a house of recovery."

To what extent local sanitary authorities and physicians will unite in the requisite efforts to secure the construction and out-fitting of contagious disease-refuges may not now be foreseen. The timely and well sustained movement that now promises model structures and organiza-

tion for contagious disease-refuge and hospital on the East river side, at Sixteenth street in the city of New York, and the plans on a basis of hospital charity for a like purpose in Albany and Rochester, will soon unfold such results of utility and experience generally as should guide each of the twenty-four cities, and a hundred or more of the large villages in adopting adequate means for complete control of the contagious diseases. Certainly the enlightened efforts of medical practitioners in their advice to, and coöperation with, local boards of health, and in their professional directions for the domestic separation and special care of the sick, are the most important of all means for repressing the domestic pestilences. The significant fact is now chronicled that in several towns in which are populous villages, the town board of health has caused a refuge and hospital for contagious diseases to be established upon grounds beyond the village limits, while in one instance, namely, at Catskill, the village board of health has obtained a ten-acre field for its refuge and hospital, safely beyond the village streets. The very desirable plan of obtaining extensive areas of ground, usually from five to twelve acres, on long leasehold or by purchase, and of giving considerable permanency to the structures of the refuge, has found favor in various places in the State, and it will be desirable to add to this first series one approved plan for a more permanent pavilion refuge and hospital.* In all of these plans the administrative and accessory requirements of the refuge are, for obvious reasons, provided in separate structures. This is best and most economical wherever the building site is sufficiently extensive, yet if a restricted space of ground, or other reasons, should make it necessary to bring all such accessory parts under the same roof with the refuge hospital, a very convenient mode of doing so will be found by converting the parts **3** and **F**, into administrative quarters. See page 266.

*The board of health of the town of Niagara has, with the coöperation of two village boards, and with the approval of the town auditing board, erected a refuge hospital, with four apartments, on elevated grounds beyond the villages. The town of Queensbury has done likewise, for the benefit of its principal village, and has made permanent the hastily constructed little pavilions that were used in the suppression of a small-pox epidemic in 1881.

[No. 27.][a]

CONTAGIOUS DISEASE REFUGES:—TEMPORARY HOSPITALS

FOR

SMALL-POX AND OTHER PESTILENT CONTAGIONS.

Prepared and Distributed under Instructions from the State Board of Health.

BY THE SECRETARY.

The illustrations upon the next two facing pages present examples of the most suitable and readily erected Hospitals and Refuges for contagious diseases that need to be quarantined.

PLATE I shows Refuge-Huts, and accessories, built of wood.

PLATE II shows Refuge Tent-Hospitals.

No. 1, & A, in Plate I, show the plan of a temporary hut which can be erected and made ready for two patients in a day or night. Length, 22 feet, width, 10 feet, and height (average), 12 feet. Total cubic feet of air-space = 2,640.

This little hut or pavilion (1 & A) has four or five windows, and may be warmed by a stove. It is designed to meet the first urgent necessity for quarantining one or two patients until a larger structure (2 & B, C, D) can be erected for greater numbers, when this may be reserved for convalescents. If only two or three patients are to be so placed in Hospital this hut is sufficient. [The cost of it, at the lowest, is about $65.]

No. **2 & B, C & D,** show plan of a larger structure in which from six to nine patients, with the same kind of contagious diseases can be well accommodated. Its accessory structures may be erected after the shelter for the sick is completed. This pavilion is 22 feet by 30 feet, = 660 square feet of floor-area; with a mean height of 14 feet. Total cubic space = 9,240 feet. The length may be increased at pleasure. Every 10 feet of such increase will add 3,080 cubic feet of air-space, and enough for two or three additional patients. There should be no partitions (unless deemed necessary for locked separation of sexes). The floor-screens, — C, D & G, — are the only means of separation ordinarily needed.

No. 3 (& F) is the plan of an accessory building, with shed-roof and five or six compartments. Its front line is 20 feet back from the sick ward.

No. **4** shows all that is needed for a disinfecting-room and a dead-house. (Needed in an epidemic.)

No. 5 (& E & E^1) shows plan of privy arranged for sanitary security, at least cost, as a disinfecting and dry-earth closet. Its tubs are the halves of a kerosene barrel.

Fig. **A** shows south-end view of No. 1, the temporary and convalescent ward.

B presents a view of either end of No. **2** and **C,** with the end windows and one of the doors.

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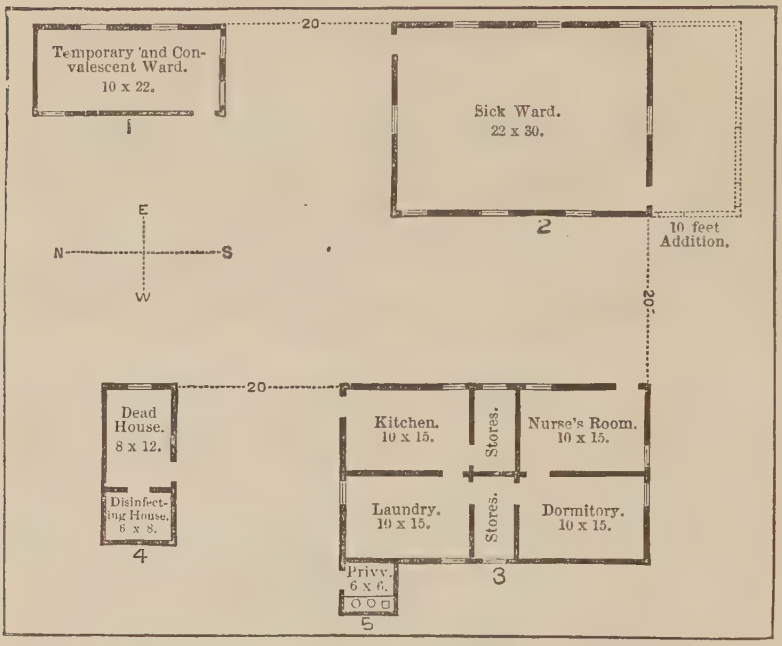
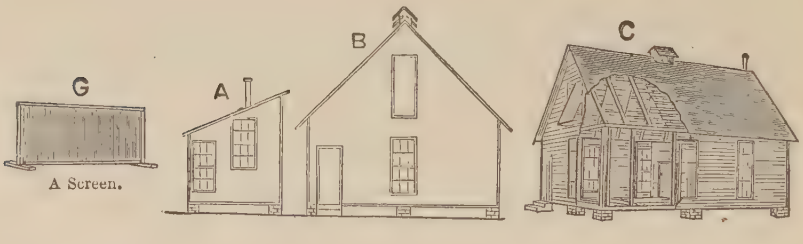
* This and the three following pages constitute [No. 27][a] of the Permanent Series of Sanitary Papers. [See No. 27, page 318.]

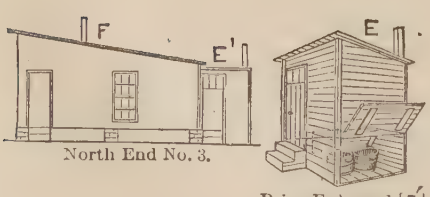
CONTAGIOUS DISEASE REFUGE AND HOSPITAL.

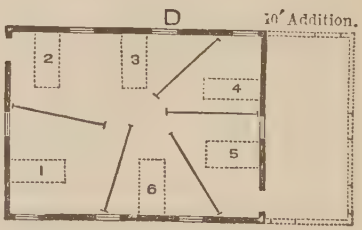


Inclosed Area, isolated, as here shown, 75 x 92 feet.

[This quarantine-ground to be extended 50 to 100 feet on each side.]

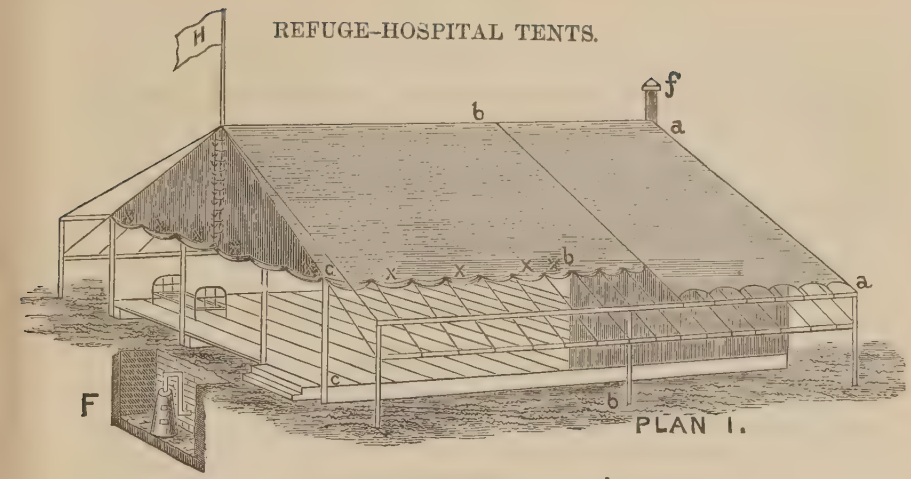


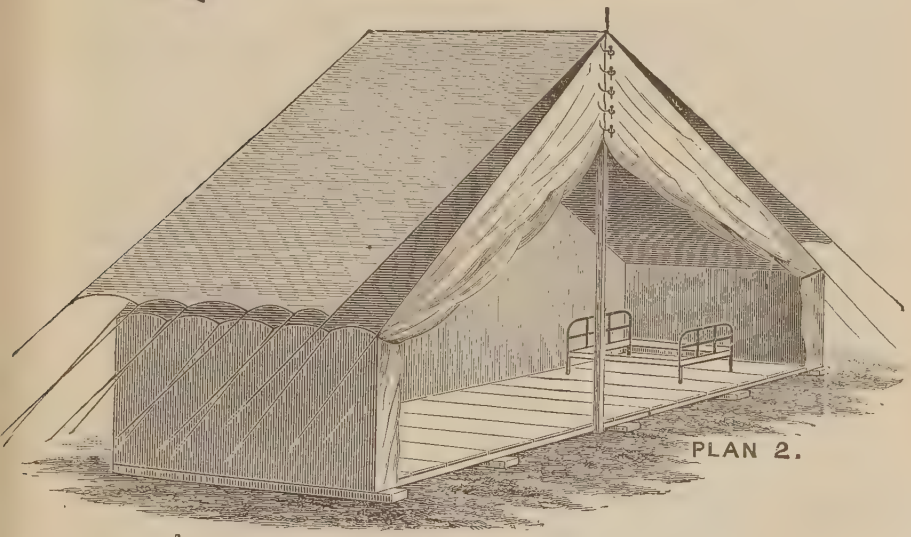


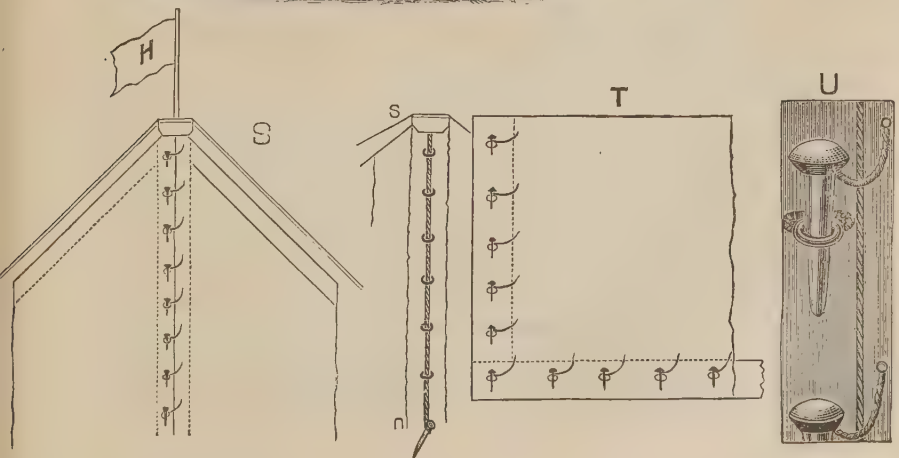


To accompany Third Report of State Board of Health of N. Y.

REFUGE-HOSPITAL TENTS.







Modes of Closing and Fastening Canvas.

[1 Annual Report State Board of Health of New York.]

C gives an interior (broken) and an exterior perspective view of pavilion **2 & B**. The positions of its ridge-ventilator, and its gable window swung on an axis,* are seen.

D shows the ready subdivision of floor into bed-spaces that may be separated at pleasure by the movable screens. [G.]

E & E′ & 5 are views of the privy, etc.

F is the north end-view of kitchen, laundry and privy.

G shows face and feet of a screen; length 10 or 11 feet; height 5 or 6 feet. Two flat-feet of plank-strips, with firmly fastened end standards and a cross-bar, with a face of stout muslin stretched and fastened by moulding-cleats and headed tacks*, are all that are required for such screens. The muslin may at times be used as the means of disinfecting the ward-atmosphere by the alkaline Permanganate or spirituous Thymol solutions, which may be painted upon the screens as required for evaporation, continually, or at intervals. †

REFUGE-HOSPITAL TENTS--PLATE II.

PLAN No. 1 shows a well-floored and warmed Tent-Hospital, with an extended *Fly*. The whole, or any section, may be open at the sides and ends, and any section may be completely or partly closed, at the option of the physician. As here seen the floor and sides and south-west end are open (b to c), the rolled canvas is looped up at **x x x**, to be let down in a moment, and fastened, to protect any section or all sides.

As here seen the tent-floor is supposed to be 20 by 40 feet, = 800 square feet area. The mean height is 12 feet. Total cubic feet of space within the Tent, = 9,600.

F shows a jacketed stove; and **F f** shows the course of the hot-air flue, which is a large sheet-iron cylinder within which the smoke-pipe from **F** extends to chimney-pipe **f**.

PLAN No. 2 is an ordinary Hospital-Tent, with the Fly spread as a double roof; but that, or another Fly, may be extended in front (to south-east) and the extent of flooring may be doubled and the hospital capacity thus increased. The floor-area, as here seen, is supposed to be 14 by 16 feet; and when extended, — for a Fly-canopy, — it would measure 16 by 28 feet. The latter is sufficient for four or five patients and an attendant; the former for one or two. Where the materials are ready, and in good military order, this kind of Tent-Hospital can be erected and prepared in an hour from the time the grounds and floor are prepared.

S, s, & U, show the method of *fastening* the overlaying margins of canvas at the gables and sides of tents. **S & U** show the pin, ring and button-hole methods and **s** shows how to use a heavy cord with its "needle" dropped through a series of rings or staples to become a fastener.

T shows how to make, and to close, a ventilating-window in an end or side of the tent, also how to attach and fasten strips of canvas.

To erect the Tent-Hospital — Employ a man whose army experience or other knowledge and tact will serve the purpose. Second-hand canvas will answer for a Small-Pox Refuge, as the Tent must be burned as soon as out of use.

To secure dryness — Select dry and moderately elevated ground, and, if not on a rock, dig a trench two feet in depth entirely around the Tent, — within two or three yards from it, — and give it a secure outfall.

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* Windows for *ventilation* are quickly made in the same way as the bed screens, with unbleached muslin stretched upon frames. Half of the ward windows, or one-half of every or any window, may thus substitute muslin for glass.

† The builder's specifications, in details of materials and cost, are given in the Board's Circular, [27]*b*.

Special sanitary rules to be observed in the care of the sick with infectious disease. — The infective poison or contagium of each of the maladies that is subject to quarantine, or the restrictions of isolation, has certain peculiarities of its own, yet has others which are in common. The attendants upon the sick with such disorders, whether in the family or the contagious disease hospital, should conform their rules of sanitary duty so as to completely prevent the diffusion and operation of the infection. Most if not all of the contagious diseases may be spread from the sick to other persons by means of their excremental outflowings; some spread or are infectious in no other way, it is believed, as in the enteric ("typhoid") fever, malignant cholera and certain kinds of dysentery. Small-pox, scarlet fever and diphtheria may be spread in like manner, though the former two have their infective poison most concentrated in and readily diffused from the surface of the body, while diphtheria diffuses its infection most readily and copiously from the fauces and nostrils, and typhus and the relapsing fever spread their intensely active infection from the surface of the body, the breath and every thing that may retain and convey away the infected air which is close about the sick or the dead of either of these low fevers. The deadly contagion of malignant pustule (the *charbon* of cattle and sheep), and of glanders (of the horse) is, in each case, spread directly from the sick beast, by whatever means conveyed. There are other and rare kinds of deadly contagions and infective processes, all of which require that the sick be isolated; other kinds of contagion, for example, measles, rotheln and whooping-cough are endurable evils that may be measurably repressed by timely separation. There is one most destructive infection that, so far as known in our northern latitudes, is borne from its habitats at the south and from any place where planted, chiefly or wholly as infected air with the poisonous germs adhering to, or inclosed in porous substances or closed vessels, and transported from the infected atmosphere of the places in which the malady prevails; such is the infection of yellow fever.

The rules to be observed by attendants upon any of the contagious diseases which infect the air of the sick-room require:

(1) That the attendant shall not mingle with other people, except under medical regulations relating to the necessary personal preparation for such liberty.

(2) That the physicians shall strictly conform to sanitary regulations and practices while exposed to, and liable to be carriers of, contagion.

(3) That all who in any manner visit or expose themselves to the infected sick-room, or handle infected things, shall strictly conform to sanitary regulations to prevent harm to themselves and others; and that all infected things and premises shall be promptly and thoroughly disinfected, and that none of these sources of danger shall be at any time or in any manner left unguarded.

The cardinal principle which must have sway in the sanitary care of the sick and the wards or apartments they occupy, is comprised in such medical and nursing service, as best protects and fortifies the patients in their conflict with the disease, and which constantly enforces the rules of thorough cleansing and disinfection of clothing, utensils, and of all that emanates from the sick. These sanitary regulations, and the principle on which they depend, are concisely stated in

Sanitary Papers 13, 14, 15, 16 and 27[a], as given in other sections of this appendix.

Precautions must be observed by all persons visiting contagious disease-refuges and the sick from contagion; and as the large experience in England, where there are now nearly 400 hospitals for contagious diseases, has led to the adoption of very suitable sanitary regulations for this purpose, the following brief abstract of them is here quoted. They are essentially the same as were for years in force at the quarantine hospitals of the port of New York. This guarded kind of necessary intercourse with the sick-room and its inmates rarely has done harm:

I. The visiting of patients in this hospital (refuge) is limited to nearest relatives and intimate friends of patients *dangerously ill.*

II. Notice will be sent to the nearest known relatives of patients dangerously ill. Such a notice will be accompanied by a copy of the regulations under which visits can be made.

III. Parents will be allowed to see their children (under necessary rules).

IV. Visitors are warned of risk in entering the hospital.

V. Visitors are advised not to enter the hospital when in a weak state of health, or in an exhausted condition; to partake of food before entering the hospital; to avoid touching the patient or exposing themselves to the breath or to the emanations from the skin; to sit or stand at a little distance from the patient, and not to handle the clothing, etc.

Conveyance of the sick to the refuge hospital. — The ambulance may be any easily-sprung covered vehicle, which will not be used for conveying others than the sick, and which can be thoroughly disinfected. Public coaches and cabs must not be resorted to for carrying the sick. During an epidemic of the infectious disease treated in such hospitals a suitable vehicle and mode of transportation for patients must be adopted, and should be such as will insure perfect care and tranquillity of the sick *in transitu.* The member of the family or the nurse who accompanies the patient should be fully instructed in duty.

Sanitary Procedures in Practice.

Every case of small-pox, diphtheria, scarlatina, typhus or typhoid fever or other infectious malady, being, by sanitary regulations, in every town, city and village, *reported to the local board of health as soon as known,* the action taken by the physician, the family and the health officer should be:

(1) To separate the patient or patients from all persons liable to take the disease.

(2) To provide such perfect sanitary care for the sick, and such prompt and complete disinfection for the apartments, clothing and other things that require disinfection, that disease shall not spread from them.

Duty of physician, householder and family. — Small-pox, diphtheria, scarlatina, typhus or typhoid fever being discovered and certified to exist in any house, the physician in attendance and the house-

holder, or family where the disease appears, is required to give notice to the health officer, or if there is no health officer, then to the nearest member of the board of health, stating the name, age and circumstances of the sick person or persons. The medical attendant should at once separate the sick from all others than those who have the care of the cases, and should also carefully instruct the family concerning duties to themselves and to the sick.

Duty of health officer and board of health.— Be prepared to give specific directions, both verbally and by the printed card, showing precisely what to do, what to avoid, especially in regard to the apartments and persons where the sick are, the care and disinfection of all things that can communicate the disease, and also in regard to the rules concerning improper intercourse with and movements of the sick and whatever can convey disease; also the sanitary purification required at the termination of the case. The official card for this purpose should be placed in the hands of those in charge. The medical attendant is responsible for the duty of faithfully enforcing such rules and regulations as long as the sick and the family are under his professional care.

The sanitary authorities should direct the methods and extent of disinfection, but it is usually best to do this by the help of medical attendants, in no case, however, permitting these duties to be omitted. The official notice to the households and their medical attendants should state these rules and duties plainly and briefly. The following is a suitable form for such notice to the family or their physician:

A—— B—— being sick with [small-pox] must be kept entirely separate from all persons except the appointed attendants, and no others can be allowed to remain upon the same floor of the house, unless they have had [small-pox,] or [been successfully vaccinated] within a few years. The directions given in Nos. 15, 16 and 41 of the State Board of Health papers should be faithfully followed.

The attendants, as well as the sick themselves, must be kept entirely away from all persons who are not already protected against the contagion. The attending physician and the undersigned will give any information desired in each case, and the official release from sanitary restrictions will be given in writing as soon as it safely can be.

By order of the Board of Health,

(Signed) ————————————

Health Officer of ———.

Note.—Whenever a transfer to the refuge-hospital is agreed upon, the health officer's or attending physician's orders for the disinfection of premises and materials should be indorsed on this memorandum.

Quarantine and other sanitary orders against contagious disease.— Though it is presumed that the health officer and the board of health will, with rare exceptions, have the confidence and concurrence of the people, so that sanitary orders and instructions will be promptly complied with, the law provides suitable means for enforcing any necessary order of the local board of health.

An order for the isolation or quarantine of any source of dangerous contagion is absolute in its nature, and must be promptly obeyed; and

under sections three and four of the Public Health Act, as amended in 1867, 1881 and 1882, it is provided that "Every person who shall willfully violate or refuse to obey any order or regulation, * * * so made and served shall be deemed guilty of a misdemeanor," and by issuing its warrants to the constable, the Board may "apprehend and remove such person as cannot otherwise be subjected to the orders and regulations by them adopted." In the execution of such orders the officers are required "forthwith to execute them, as if the same had been duly issued out of any court of record."

Small-pox, diphtheria, typhus, typhoid and scarlet fevers and cholera may occur under circumstances that require such prompt action. The State Board has issued special sanitary papers, Nos. 13, 14, 15, 16, 38 and 41, to aid health officers and families in their duty concerning these diseases.

Records of deaths and prevalent diseases.— The laws require these records to be returned to each local board, as well as the State Board of Health, by the health officer. Card No. 30 has been prepared for this purpose, and is supplied by the State Board. Cards 31 and 32 are for use by the medical attendants upon small-pox and diphtheria, and are supplied by this Board to physicians through the local board.

Temporary quarantine:—Refuge and Hospital. — There are four ways of quickly providing a suitable refuge and hospital for contagious disease:

(1) At home, upon the upper floor, or in any completely secluded part of the house,— cleared of all occupants, except the sick and attendants.

(2) A separate little building suitable for a hospital ward ready for use.

(3) A board hut or a pavilion, hastily constructed for the purpose; or

(4) A hospital tent and fly canopy; and these are the safest kind of contagious disease refuges, during the warm season.

The *first* is the common expedient. It is best that the entire floor, or that a separate quarter or end of the dwelling, be set apart for the domestic quarantine of the sick.

The *second* is occasionally the most available and suitable method. Such a separate building should be in a healthful spot, and thoroughly ventilated.

The *third* is frequently the best method of quickly and effectually providing for any increasing number of patients. The preceding plan and specifications for a contagious disease-refuge and hut is designed to show what may be constructed in a single day to meet an emergency, such as frequently occurs in villages, alms-houses and asylums. The hospital tent is the best kind of refuge in the warm season, if the tent-canvas and materials are at hand. The preceding plans and directions for the tent-hospital will be readily understood.*

These methods need no further explanation in this chapter; yet as regards any method of isolation, removal, and the quarantining of contagious diseases, *we must be careful to do the sick no harm* while the people are being incited to the duty of removing and preventing the causes of disease.

The objects of this chapter will be attained if health officers and boards of health find their duties made clear and their work facilitated by it.

*See pages 268-271 *ante*; also Sanitary papers 27 and 27 *a and b*.

[I.]

MEMORANDUM UPON OBLIGATORY VACCINATION AND THE MAINTENANCE OF PERFECT VACCINE VIRUS AND KINE-POCK.

The amazing discovery of the protective property of kine-pock so far preceded any scientific reasons or account that could be given of it, that the civilized world has received this boon as an unaccountable benefit rather than as one of the most recondite evolutions of a truth, the science and application of which necessarily require the most exact observations and proving. Though Dr. JENNER, the discoverer, seems to have comprehended the necessity for the scientific basis of vaccination as it became a branch of medical art which he hoped would redeem mankind from the doom of the horrid and contagious pest which was destroying in a dreadful way nearly a tenth of the race, he lived to witness and protest against the ignorant and reckless abuses of the practice of vaccination, which have, ever since that time, greatly discounted its utility, and invited the harsh criticism of persons who misjudge the charlatanry and stupid malpractice which result in spurious and cruelly deceptive consequences, to be the legitimate outcome of the kine-pock practice.

While JENNER and the chief physicians and statesmen, seventy or eighty years ago, were rejoicing to see numerous governments adopt, provide for, and even enforce the duty of vaccination, they learned, a few years later, how execrably negligent and unworthy were many of the physicians who publicly and privately assisted in this new medical duty. The public as well as private practice of vaccination has ever tended to become a merely formal and empirical matter, because it is so generally viewed as a sort of mysterious incantation, of which the point smeared with lymph-virus, or bearing a particle from the dried sore of a pock, acts as the "charm." Whereas, it is true that instead of mystery and the "charm," the procedure to vaccinate should be treated as the nicest of medical arts and physiological tests, in which a natural susceptibility to the loathsome contagion of small-pox is to be overcome, and in which the perfection of such conquest over the liability to deadly contagion actually depends on the definite qualities of the lymph-virus as respects the precise development or culture and taking of it, and as regards the minutely important conditions of the keeping and using of it.

The facts relating to all these matters were ascertained and very clearly stated by Dr. JENNER, in his day, but for want of a demonstrated and scientific basis of the physiological and ætiological knowledge by which the art and practice of these endless generations of the cow-pock virus would naturally be determined with rigorous precision, the faulty and untrustworthy kinds of vaccination almost equal in amount the correct and completely protective vaccinations.

Experience has long and extensively taught that the average vaccinations in ordinary medical practice will not abide even the old

Jennerian tests of worthiness, and that the public or gratuitous vaccinations rarely will rank higher than the vaccinations in private practice. To remove and wholly prevent such perilous faults in the practice of vaccination, there must be timely intervention not only by public health instructions and methods, with some aids and incentives to secure the adoption of correct practice and adequate means, but, also, there must be a minutely careful and physically comprehensive intervention of scientific research to determine the intimate nature of this wonderful inoculation process. The perfect rules and examples of JENNER and other worthy instructors have not been well followed. A rational insight and a comprehensive generalized principle or law seems necessary, to command universal deference to the rules for securing perfect results in vaccination.

Investigations in progress.— Though the fact seems well established that by incessant watchfulness, skill, and continuous reproduction or generations, it is possible to keep up the perfect protective attributes of the kine-pock in its humanized form, there is no doubt that the tendency to degeneracy, or a decrease of efficiency and energy, is to be confessed. The early vaccinators certainly witnessed wonderful results of tested protection against the contagion of small-pox. Thousands of vaccinated persons were inoculated with the contagious matter of small-pox, with rare instances of any receptivity of it. During the first thirty years of the present century there were frequent renewals of the kine-pock from the herds. There also followed a great variety of experiments to ascertain the actual origin of the kine-pock and to discover what natural relations exist between that disease, the variolous disease of the horse (*variola equina*), the variolous malady in sheep (*variola ovina*,) and the small-pox in man. Each of these diseases has been proved to have such alliances with the three others that, so far as human small-pox is concerned, each of the three forms of variola in the domestic animals here mentioned will, when made to operate by inoculation in the human system, protect against small-pox. Further tests go to prove that each of these four kinds of disease-virus confers entire protection against each and all of the other three diseases.

The question of actual identity of these four maladies, as we witness them in four of the families of the mammalia, is of less importance than the fact that whichever is communicated to any individual of these several groups of beings, it tends immediately, by its operation as a morbid infection, to remove the *receptivity*, before existing, for each one of the other viruses. Though this demonstration is most complete as regards man and the bovine species, and as between the horse and that species, and the horse and man, the entire triple series of interchangeability, or, at least, of communicability and a protective result, may now be regarded as being completely demonstrated.

The pocky maladies in the horse and the bovine species are not all variolous ; and it is only in the heifer or bovine animal that the vesicle is found to be identical with that which in turn results from its inoculation in man. While Mr. Ceeley and Mr. Badcock proved that from two to seven per cent. of the heifers they inoculated or attempted to infect with the contagious matter of small-pox, actually took the disease, and that with great care in subsequent culture and humanization of the vesicles, they became apparently identical with vaccine vesi-

cles, the fact remains that the natural kine-pock, and the products of its continual artificial inoculations, constitute the defense of mankind against small-pox. Therefore the discovery and utilization of every perfect case of the natural kine-pock have become vital sanitary duties. The local government medical officers in England have for years searched and experimented in vain to secure a valid and efficient new stock of vaccine lymph directly from the cow, and, recently, their inquiries brought the horse, with the "greese" so called, under experimental use for the purpose of developing the true kine-pock in heifers. Failing in this, (from obvious causes.) that government is continuing its search after primary outbreaks in a herd of cows. The English still adhere, by preference, largely to humanized vaccine lymph.

Bovine virus, as cultivated continuously in heifers, for human vaccinations, now so extensively employed in the United States, is depending exclusively upon the line of supply that was started in a dairy herd at Beaugency, in the department of Loiret, France, in the spring and summer of 1866. Designed, at the time, to silence the agitation and fears relating to the alleged contamination of humanized virus, on the one hand, and, on the other, to overcome the objections to further employment of the enfeebled virus produced and cultivated from the degenerative process and practice of retrovaccination, or re-inoculations of humanized virus into the cow, the Beaugency bovine virus is now the chief stock of animal vaccine for the civilized world. It has come gradually into use in the State of New York since the spring of 1870.

To find and utilize an efficient and perfect new stock of kine-pock is so plain a sanitary duty that the State Board of Health has caused extensive inquiries and some investigations and tests to be made. The skillful aid of Prof. James Law, of the Cornell University, has been brought into this important service, and up to the present date three herds, in which the kine-pock has appeared spontaneously (or by some source of contagion yet undiscovered), have been put under observation. The inoculation tests upon heifers have not yet yielded satisfactory results, but the habits and pathological phenomena of the natural cow-pock are successfully studied, and ere long there will be successful inoculations, it is believed, when all the conditions favor.

A memorandum upon the essential rules for perfect vaccination, and concerning the vaccine virus.— Though it may possibly be found at some future time that Pasteur's discovery of a principle and method of reducing a contagious virus to a kind of sterilization that allows its protective operation, without harmful or contagious results, may lead to a benign use of inoculations for other diseases than small-pox, the present interests of mankind are best served by a faithful following of the essential rules for obtaining and applying the kine-pock, and for maintaining the purity and perfectness of this kind of protective virus in continuous generations of it, from child to child, or from heifer to heifer. JENNER and the early vaccinators frequently resorted to the primary source of the pock in dairy herds, yet they did not attempt, by continuous inoculations, to perpetuate a bovine source of such vaccine lymph. In the spring of 1816, when there was just anxiety for the quality and efficency of vaccine virus, and arm-to-arm vaccination was the trusted method, JENNER himself wrote to a friend that the

virus he was using in his vaccinations, week by week, was derived "from a cow sixteen years ago," and he added, "If there were a real necessity for renovation I know not what we should do, for the precautions of farmers have driven the cow-pox from their herds." Fortunately the natural kine-pock still occasionally occurs, and affords new opportunities for the renovation of vaccinal matter, and still further, the art of inoculating heifers and maintaining a continued series of generations of the bovine virus has been acquired. The entire feasibility of perpetuating the perfect protective attributes of the primitive virus from the cow, whatever adversities or success may chance to attend the common practice of vaccinating from arm-to-arm, or with stored humanized vaccine matter, it has become equally as important to inspect and record the results of each vaccination with heifer virus, and also demand that the production of such animal virus shall be a perfect art, as it ever was and ever will be in the vaccinations with humanized virus, to select the perfect lymph at the proper hour of its maturity, and to watch its operation.

The bovine lymph-culture and selection is a delicate and responsible art, and it requires skill and conscientiousness to render any marketing of it at all trustworthy. The culture and arm-to-arm inoculations which perpetuate the humanized vaccine matter are more generally understood and are not open to mere trade indifference and faults. Yet each of the two methods of culture and procedure are liable to neglectful abuse and failure. The same kind of painstaking, and essentially the same principles and rules are necessary for success in the practice under either system of vaccination and of culture of the virus or lymph for use. Experience and medical opinions in this marvelous field are necessarily transitional, yet no expert vaccinator to-day can deny that the experience and lessons of Dr. JENNER himself have, upon the whole, proved the most distinctly correct and impressive of all instructions concerning the phenomena and signs of vaccination and concerning the rules for selecting true vaccinal virus. For this reason a concise summary of JENNER'S own recital of his experience should be kept as a *précis* in the conspectus of the family physician.

Whether physicians continue to depend chiefly upon bovine-cultured lymph, or at last resort again to humanized virus, there will continue to be the same necessity for all the conscientious discrimination and care that JENNER illustrated and taught in the selection of the lymph-virus and in vaccinating. Whatever revulsion and medical contentions may hereafter occur in regard to the absolute and comparative merits of the two modes of culture and procuring of vaccine virus, and whatever may be the new developments of true scientific knowledge of contagions and viruses, and especially of small-pox and vaccination — and such growth of science in this matter is now in progress — these observations and rules of JENNER will doubtless demonstrate such comprehensive principles as will before long establish the universal faith and most perfect method in the art of preventing small-pox by vaccination. The new statement of the essential physiological principle and the comprehensive result of vaccination or the inoculation which benignly supersedes the pestilent operation of a disease contagium, as now set forth by M. Pasteur, or as taught by Robert Kock and others, tend to exalt the common-place and generally indifferent performance of human vaccination to be, henceforth, one

of the most exact and scientific medical arts, so that the routine duty and indifferent act of vaccinating the human arm has become to all enlightened physicians what it was believed to be by Dr. JENNER, the nicest of scientific work. Even for the saving inoculation of cattle and sheep, to neutralize and prevent one of their pestilent maladies, the people of Europe now command the services of scientific masters like Pasteur. Much more, for the welfare of the human family, should vaccination, as a public health service, be directed and practiced under scientific instructions and with all the accessory means for securing absolute perfection in this medical and sanitary duty.

The obligatory duty of vaccination.— The general statute for the preservation of the public health in this State provides that every local board of health may require and gratuitously offer vaccination in every community; and the special law for securing the vaccination of all school children authorizes the exclusion of all unvaccinated children from the public schools. The local authorities have ample power to make vaccination an *obligatory duty*. This is about all the significance that can practically attach to the term "compulsory vaccination," except that *fines* and *penalties* might be ordered under enactments of the Legislature. Under the existing laws in this State no fines or other punishment can be imposed on those who refuse to comply with the sanitary rules of vaccination. The disability that may be visited upon school children under the school vaccination law is the only constraint inflicted (except in the presence of small-pox), upon the families of the unvaccinated, under our laws. Yet many an employer of companies of work-people, during the past few years, in this State, has enforced, as an employer's right, the order to every employee to present evidence of vaccination as the condition for employment by him, on and after a date or hour mentioned. This excellent rule is as impressively obligatory and practical as it is compulsory. During the past two or three years we have witnessed the uniformly beneficial and kindly operation of this voluntarily adopted rule, in some instances extending to all workers in textile fabrics in great manufacturing villages, and in one case to nearly five thousand mill operatives of a single firm. The entire success and popularity of this rule of vaccination of the employees and families connected with the Krüpp's gun factories and iron works, now the largest population in the world under one employer, sufficiently corroborates the justice and utility of this coöperation of great employers with the public sanitary authorities in securing general vaccination.

Compulsory methods, and even the employment of the term "compulsory," for securing general vaccination, cannot be adopted under any of the existing laws of New York. *Obligatory* is the appropriate term by which to designate the highest authority which can be exercised to induce compliance with the duty of, and any official orders for, vaccination. Exclusion from the public schools, exclusion from favor by employers, quarantining after, and in consequence of, exposure to contagions, together with an official record of the refusal to be vaccinated, are, in New York, the substitutes for penalties for non-compliance with the sanitary rules for vaccination; it is thus that the *obligatory* is, in practice, the substitute for a *compulsory* system. Were the State and local sanitary authorities able to offer all the per-

fect vaccinal service and perfect virus which the people need, and were it expedient to substitute gratuitous public vaccination for the medical practice of it by family physicians, the pleas for compulsory vaccination laws would demand a better hearing than at present, and penalties which would make them *compulsory*, be tested.

The *obligatory* principle and its methods in securing general vaccination should be so applied that serious disabilities or the withdrawal of valued privileges would justly result from refusal or neglect to accept the proffered protection against small-pox. Such deprivation and loss should be an obviously just and self-procured consequence of neglect to be vaccinated, as it is publicly confessed to be in the cases where employers prescribe the duty as obligatory toward them and toward the associated companies of work-people. The State, the local boards of health and school boards successfully apply this principle of obligatory action in the adoption of methods which lead to the reasonable preference and acceptance of vaccination when any just alternative is presented; and all experience shows that in giving success to the general laws or the local orders for vaccination, these two circumstances must be provided for as essential in the methods adopted: *First.*— Information and instruction given in such manner as to enlist the intelligent interest of all concerned. *Second.*— The means for enabling every person to comply with the requirement to be vaccinated must be offered, even where it is exclusively an official or business ordering, as in the case of Krüpp, the gun-maker, or in the manufactories of textile fabrics, as we have seen, so that all persons shall be without excuse for failure to comply.

Precisely what the employer and the school board can so successfully do, the health laws of the State and the lawful regulations and orders of local boards of health may require and provide for; and here begins the *State system* of vaccination. A *system* that shall be adapted to secure universal and perfect results in vaccination requires that the public health authorities shall adopt the necessary measures both to advise and to offer, or instruct where to secure perfect vaccination for every person, and especially for every child before its first birth-day. That the quality and efficiency of vaccine virus shall be so certainly adequate at all times as to prevent delays and defects of vaccination. That by State and local authorities all necessary information, advice, regulations and methods shall be made known to every parent and householder, to secure timely vaccination, and that every one shall be without excuse for neglect or failure of the operation.

Forecasting the development of methods and of some amendments of laws for making vaccination not only universal, but in the highest degree protective throughout the State, studious attention has been given to each of the three propositions here stated, and they have together assumed a definite shaping into a practicable plan. The fact seems to be generally conceded, that aided by the medical profession and the registry clerks who record the births, the boards of health may, and should, duly notify all parents and custodians of infants that the vaccination of every child is required previous to a time mentioned, and, at the latest, before its first birth-day. The public registry of births must aid this duty of notification, and it may also help preserve the records of vaccination. It will be quite practicable to extend

such notification and sanitary instructions in regard to vaccinating infants beyond the list of the voluntarily and medically returned records of births to all parents and custodians of those not so reported, simply employing the same means for such instructions as must be used in the periodical search or canvassing which shall henceforth discover the full number and records of births. In all essential particulars the vaccination laws and regulations of Scotland can be adopted in the State of New York. The details of such a plan are not difficult to arrange and order to be carried into operation, and they would constitute a system of obligatory duties not difficult or disagreeable to the people or to the health boards. Thus the first and the last of these three propositions for providing ways and means of general vaccination would be in proper ways connected with records of the births, month by month and year by year.

The second proposition is open to wide differences of opinion and to diverse details of administration. As vaccination has hitherto been dependent wholly upon the bare chance of some such measure or appearance of obvious success in the inoculation that would pass the common judgment as being the vaccinal sore, even the medical practitioners in this State may at first fail to acknowledge the necessity of special supervision or an established certainty of the production and adequate public supply of perfect vaccine lymph. For, as regards the validity and perfectness of *vaccine virus*, it is the common opinion (however fallacious and dangerous) that being a specific and marvelous thing in and of itself, it is ever the same and cannot be any thing else, or be changed or degenerated to some harmful thing perilous to use. And as regards the constancy and adequacy of the *supplies of perfect vaccine virus* on hand and subject to any necessary requisitions for it, few persons are aware how precarious and limited such pre-existing supplies are, and how dangerous and unworthy are the advertised and the long-stored stocks of vaccine matter.

The practical questions relating to *skilled supervision* on the one hand, and the perfect conservation and *safe purveying of the vaccinal lymph* without assuming any commercial relation to it, on the other hand, have to be settled in this State in some way most acceptable to physicians and the people. The very first necessity is to obtain entire immunity from the spurious and every kind of detrimental or harmful virus. And this may be brought about by the supervision over all the stocks and supplies of vaccinal matter offered for sale or use within the State. The sources and dates of the supplies, and the names of the producers and each of the persons in trade or otherwise transmitting the supply or samples, will need to be recorded by the persons selling virus; and over these regulations the boards of health, and, as a central supervisor, the State Board, may be justly in full authority. This service will not be very difficult as there is at present only one "bovine farm" in the State, and scarcely more than half a dozen producers in other States who now supply virus to New York. The *testing* of each stock of vaccinal matter — that is, each producer's stock — occasionally, is the second condition of protection against spurious and harmful virus; and as only animal or bovine virus is now sold in this State, such testing can readily be made with entire certainty and

at small cost, under provisions which the State Board of Health can cause to be made upon heifers.

Thus far may supervision and testing be provided for under existing sanitary laws. The only other point to be secured under existing laws relates to efficiency and certainty of perfect supplies of vaccine lymph to meet all emergencies. At present we discern no surer or better way than to encourage the best of the producers of bovine virus to have their resources under such command as to be enabled to respond to all reasonable requisitions for virus. The supplies required for 5,000 vaccinations can be commanded in an hour at present in this State, and adequate supplies for 20,000 might be commanded at from seven to ten days' notice. The system of supervision and testing will necessarily be principally at the expense of the State Board of Health, but it need never be a costly means of protection.

To these means for maintaining the validity and efficiency of vaccinal supplies, as well as of the general application of vaccination in the State, there is to be added, of course, a ceaseless effort to maintain such constant study of results of vaccination among the people, and such search for and culture of *primary kine*-pock, as will, if possible, enable the medical profession and boards of health to be sure that the greatest perfection and efficiency of the inoculated vaccine pock is secured.

To illustrate the leading points which are submitted in these statements, and to awaken a deeper interest in the duties here described, the following notes are added, upon

(1) The most essential conclusions concerning vaccinations, viewed as a sanitary duty.

(2) The investigations now in progress for ascertaining the natural laws and the existing conditions under which the cow-pock is communicated in herds, and to secure the best primary supplies of vaccine virus.

CONCLUSIONS.

That the preference for animal or "bovine" virus in vaccinating has become so general that sanitary authorities should keep themselves correctly informed concerning the producers who can supply the perfect and most trustworthy stocks of such lymph on slips or quills.

That whoever offers vaccine virus for sale should expect that the public health authorities may subject it to tests by inoculation, and should also keep such records of the purchase, reception and sale of the virus that in case of spurious results the responsibility of the source of supply may be immediately indicated.

That in devising the ways and means for general vaccination in any community all families and school boards should be enlisted and thoroughly informed by the physicians and health authorities.

That whoever offers or uses vaccine virus, "bovine" or "humanized," should be certain that it is derived and furnished from most trustworthy sources; and whoever vaccinates a person should carefully examine the results of the operation on the seventh or eighth day.

That in communities where it is preferred to use humanized vaccine virus, it is expedient for physicians and health officers to establish a

weekly vaccinating hour and day, so that the lymph freshly taken from an infant's arm shall be used.

Vaccination is so especially a medical duty that no official system should supersede the services of the family physician. The official methods, whatever they are, must be adopted to secure the action and cordial coöperation of the private practitioners and health officers.

Obligatory vaccination does not become offensive to the people if the rules and practice of it are such as secure perfect results. The ways and means and the official instructions for such vaccination must so prepare the way that the popular compliance will be prompt and universal.

That protection against the contagion of small-pox begins at the time the areola is formed around the vesicle, and consequently that whoever has been exposed to small-pox should be vaccinated as soon as possible and certainly within four days after such exposure, as with four days less time for incubation of vaccine virus than is usual for that of the small-pox contagion, the vaccination or re-vaccination *may* protect.

That were every person re-vaccinated until the susceptibility to small-pox contagion is exhausted, individuals and entire communities would be completely protected. Such is the protection which physicians, nurses and armies enjoy. They are *vaccinized*. Jenner and the best vaccinators ever taught this duty.

The gradual return of receptivity to small-pox contagion after puberty, or after certain fevers, or a residence in a tropical climate is good reason for re-vaccination of such person. Such physiological facts do not diminish the practical value of vaccination. *The receptivity is to be kept exhausted.*

That long experience finally demonstrates the fact that there is vast practical difference in the values of the *thoroughly efficient* and the *feeble* or *partial* operation of vaccination, and that the latter should be avoided. The science and art of vaccination require the former, in all cases ; the latter is a result of unworthy virus, unskillful insertion and use of virus, or badly adapted physical conditions, or of all or several of these faults.

Finally. — That whenever there shall be organized such a system of notification and advice for the vaccination of infants and school children, as a public health duty, as now proposed, under the State Board of Health, every family and all physicians will be kept informed with regard to the physical conditions for best success, and the means for obtaining efficient and benign vaccinal virus. Such a system is designed to secure *perfect vaccination* for every child, whether by the family physician or by the gratuitous offer of the public health officers. And that under such regulations, instructional and obligatory, all the good results which the so called *compulsory* vaccination laws could promise, are in effect secured, and that before compulsory fines and other penalties are resorted to, even in the cities, the full effects of sanitary advice and instruction, and of house-to-house vaccination by the local health authorities should be resorted to, and that in all these duties the local officers and the physicians must coöperate, and the best medical judgment should guide, the official service of public vaccination whenever such gratuitous service is offered.

[J.]

INSPECTION OF EMIGRANT TRAINS PASSING THROUGH THE STATE.

This Board, in its Second Annual Report (pp. 85–89 inclusive), called attention to an organized method of inspection which was put in operation upon each of the two through railway routes upon which emigrants are conveyed westward through the State. The plan proposed by the Board was cordially supported by the State Boards of Health of Michigan and Illinois, and by the National Board of Health. The work of inspection was continued in the State of New York, upon the trains moving westward, for some time after these other Boards had terminated their separate inspection services.

The chief purpose of this inspection was attained under the National law, enacted early in the summer of 1882, which aided in giving full effect to the attempt to secure international agreements, as described in our Second Annual Report, page 88.

Whether this Board, or those of States further westward, will be constrained to undertake any such medical inspection of trains of emigrant passengers at any time hereafter, will be shown by the experience of the National Board here referred to, and of the international undertaking for the sanitary inspection, vaccination and the re-inspection of emigrants at ports of arrival in the United States.

As shown in Health Officer Smith's report, there is good reason to believe that the comprehensive and efficient plan, which began under that officer's administration, and which was aided in its development, first by this Board, and later, with great zeal, by the National Board of Health and several of the western State Boards, has reached such conclusively satisfactory results, that it is not probable there will be a necessity for reviving the emigrant train inspection in the State of New York. Nevertheless, this Board may from time to time test the efficiency of the improved sanitation of emigrant passengers by means of the plan here referred to, by causing inspections to be made upon trains as they approach the western frontier of the State. Such inspections have been frequently undertaken, since the systematic work of this kind was terminated, and the observations so made have thus far warranted the conclusions just mentioned. Two inspectors, Drs. A. L. Perry and J. H. Trumbull, were placed on duty the 1st day of June, 1882, under instructions to examine all emigrant passengers found upon the emigrant trains moving westward in this State, to ascertain, as far as record-cards or marks on the arm would show, whether any remained unvaccinated ; also to take notice of any sickness on the trains, and to arrange for the necessary care of the sick so found. This work was continued, without interruption or the omission of any train, until December 1.

The total number of emigrants examined was 91,420. These were distributed over the different routes as follows :

Upon the N. Y. C. and H. R. R. R., examined between the city of Syracuse or the village of Lyons and the western frontier of the State	53,724
Upon the N. Y., L. E. and W. R. R., between Hornellsville and the western frontier	37,696
Number of deaths on board cars	4
Number found sick with small-pox	3
Number sick with other diseases	38
Number removed to hospital care	6
Number of emigrant passenger cars inspected	2,414

The inspectors went on duty duly equipped for their work of close inquiry and sanitary advice. They were ready to vaccinate gratuitously any who were found unprotected against small-pox. To each person who thus received vaccination at their hands, a card like the following was issued :

STATE BOARD OF HEALTH OF NEW YORK.

☞ *Preserve this card and avoid detention or further trouble.*

Verwahrt dieſe Karte und entgeht allem weiteren Aufenthalt oder Unannehmlichkeiten.

CERTIFIED VACCINATION-CARD.

Beglaubigte Impfungs-Karte.

STATE BOARD OF HEALTH OF NEW YORK.

To Certify Concerning Protection against Small-pox.

Zur Beſcheinigung in Betreff der Protektion gegen die Blatteru.

Examined..... .....1882.

Unterſucht.

Scars..... .....

Schwären.

Vaccinated.. ....1882.

Geimpft.

Signed.....M. D.

Unterzeichnet. *Inspector.*

Passenger by New York.....Railroad.
Paſſagier der New York.....Eiſenbahn.

As shown by the statement of the Standing Committee on Quarantine in the Board's Second Annual Report, pages 234–274, the Health Officer of the Port of New York exerted the utmost influence and

authority of his office to secure the effectual coöperation of National and international port regulations for protection against small-pox.

The President of the United States having by his approval and signature, November 14, 1881, given the authority of a statute to the conclusions of the National Board of Health,* the enforcement of inspections, as practiced at the American ports, and notably at New York, and of the requirements by this Board's inspectors upon emigrants passing through the State, rapidly demonstrated the intention and necessity of the methods adopted for fortifying the application of the rules which at last had thus become established under National law; and although the inspectors upon the emigrant trains found great numbers holding vaccination cards they had received on ship-board, who could not be regarded as protected against small-pox (so unworthily had vaccination been performed at the ports of departure, or on the ships), the influence and notification, which speedily began to be returned to the European ports of departure of emigrants, produced the good results which the inspections at the port and on the trains were designed to secure.

The National Board of Health promptly aided and greatly extended the organization of the emigrant train inspection, and assisted in establishing it as a system through certain of the Western States, for several months paying the salaries of all the train inspectors. The thoroughness of the final re-inspection, by the National Board's assistance, at Port Huron, where the Canadian and Grand Trunk railways enter Michigan, and at Indianapolis and Chicago added immensely to the security of the country against danger from emigrants unprotected against small-pox; for whoever failed to present good evidence of protection was subjected to vaccination. In this important sanitary service the National Board of Health proved its ability and disposition to offer useful means of general protection of the public health throughout the entire country, by harmonious coöperation with the State and municipal sanitary authorities.

The ultimate organization of the inter-State and the National work was a realization of the purposes and efforts of the New York State Board of Health, which had been urged for two years. In these effort the Board steadfastly advocated the nationalization of the inter-States inspections and a system of temporary or extemporized hospital care. Circular No. 27 of the Board's Sanitary Papers was originally designed to facilitate the care which local health boards should be prepared to give when hospital care might become necessary. Not less than twelve such refuges were prepared, and still are available, for exigencies which sick emigrants and other badly-housed persons, when dangerously sick, may present. The conclusion is, that so great has been the improvement in the sanitary protection, especially in vaccination of emigrants at ports of departure in Europe, on ship-board and at the ports of debarkation, that already we witness, in a large way, some of the best results we desired and helped to secure in the emigrant inspection. In this work the Board of Health of New York has steadfastly maintained, and will ever assert, that the central National sanitary system — the Board of Health of the United States, at Washington, is a public

* See pages 260-265, Second Annual Report State Board of Health.

necessity, required in the interests of the nations, as well as of our American States; required for protection of human life among all classes, most notably among the homeless and unsettled, whose misfortunes and any calamity of contagious sickness become a public burden and a measureless personal and family affliction to the sufferers and their friends. We say unreservedly, that the demands of humanity and the comity of nations now, and evermore must, require the existence of a National sanitary system.

[K.]

REPORT OF SPECIAL COMMITTEE ON EFFLUVIUM NUISANCES.

This committee has continued, under the Board's order, to investigate whatever complaints and sources of stench nuisance have come to the knowledge of the Board. During the year these have been chiefly

(1) Those of the Newtown creek region.

(2) Those complained of by inhabitants of Staten Island, in the region of the Kill von Kull.

(3) The Barren Island and Flatlands nuisance.

(4) The fertilizer storage nuisance.

(5) The waste and putrefaction of glutinous matters from starch and glucose factories.

The offensive and sickening stenches which arise from the Albany basin, and those which have been complained of in two successive years along the Erie canal, from Buffalo to Tonawanda and Lockport, being regarded as dependent upon certain misuses of State property, have justly been judged to require the attention of the Board of Health as well as of the Department of Public Works, and the several municipal governments within whose jurisdiction their causes of nuisance exist.

Nuisances of Newtown creek and vicinity. — As Newtown creek is but another name for stench nuisances, and as this committee showed in its report last year, it will require to be dredged, straightened and bulk-headed before its odious nuisance can be satisfactorily overcome, the committee deems it a duty to call attention again to the subject, and to urge the importance of the improvements suggested in the conclusions printed upon pages 364 and 365 of Second Annual Report of the Board.

The cause of the effluvium nuisance which were found existing at the time the Governor ordered the investigation in February, 1881, were then classed as manure dumps, extending nearly half a mile along the north bank of Newtown creek, where many thousand tons of reeking stable manure were heaped; ammonia works in the vicinity of the dumps; fat boiling in open kettles at various places; superphosphate fertilizer works; distillery works; places for recovering sul-

phuric acid from the sludge ; and thirteen refineries of petroleum and its products.

Besides these, some thirty other offensive trades or businesses, offensively conducted, in that region contributed to the nuisance. Complaints upon which this Board's action was instituted, and which were followed up by the Governor's orders, were made by inhabitants of New York city. The Executive orders were issued only against such nuisances as affected in some manner the city of New York, whence only complaints had been received.

Complaints that were brought to the attention of the Board, subsequently to the first proceedings relating to offensive effluvia from manufacturers of cream of tartar, and from various nuisances at Blissville and in the region of Maspeth, Queens county, were referred to the local sanitary authorities.

Under the circumstances prescribed for the investigation of nuisances which the Governor had directed the Board to examine and report upon, these localized evils were not subject to the Governor's orders.

At the end of 1883, there remained only the petroleum refineries in operation, of all the factories and offensive businesses which this Board had reported upon as requiring Executive orders.

The guaranty of the petroleum refiners. — The guaranty which was officially signed by and for the refiners, dated August 29, 1881 (see pages 362–3, Second Annual Report), is believed to have been in the main faithfully complied with ; yet there have been two or three refineries in which there were frequent exceptions; these were, however, among the refineries having least facilities for preventing nuisances, and the most indifferent policing of their premises.

Near the thirteen refineries for which the guaranty was given, a new company has been brought into existence, and has commenced its business offensively, producing stenches and smoke in the same way that other refineries once did. These offensive premises being wholly within the city of Brooklyn must, it is believed, be speedily brought under proper control of the sanitary authorities of that city.

Experience in the past eighteen months has proved, that it is practicable for any one of the petroleum refineries wholly to control the causes which render these establishments offensive and make the business itself at times a gross nuisance.

The essential points covered by the first guaranty herein referred to consist in the removal of all sludge waste, without exposure, to a distance of fifteen miles or more from any city.

2d. The control and prevention of all exposure and leakage into the atmosphere or elsewhere of any waste matter whatsoever from the tanks and stills.

3d. The control of all gases, vapors and odorous substances by means of complete combustion being found practicable, these requirements must continue to be enforced, and the Attorney-General has advised that all conditions and acts required under the orders of the Governor, as made on the 22d of April, 1881, should be under constant surveillance by this Board until unexceptional and constant compliance is secured.

Superphosphate fertilizer factories. — The entire removal of this class of nuisances from cities was long ago decided to be necessary,

and the accomplishment of the result is merely a matter of time. All reasonable men who are engaged in the business concede this duty, and there now remain but a few factories of this kind within city limits in the metropolitan district. These should cease to use animal matters with sulphuric acid, or follow the other factories of the kind far away from cities and villages.

Utilization of waste animal matters : — bone-boiling, bone-burning. — The waste animal matters from nearly two millions of people are accumulated in vast quantities upon the borders of the metropolitan cities, and the processes by which they are reduced to the required conditions for utilization are exceedingly offensive.

The Board, by this committee, has found it necessary to take essentially the same view of this subject which the Local Government Board of England, through its central sanitary office, has recently taken, to-wit: to support the decisions of local sanitary authorities concerning offensive businesses, when "a nuisance or injurious to the health of the inhabitants and neighborhood," and to require "that the best available means be taken for preventing injury to the public health;" that in regard to the stench nuisances "the effluvium is the gravamen of the grievance complained of," and the fact that sick persons become worse under exposure to such nuisance, is quite sufficient as a basis for procedure to prevent it, without waiting to find complete demonstration that any particular disease or death is caused by a particular stench.

It is equally true, that the fact that the odors are sickening or distressing to great numbers exposed to them is a sufficient condemnation of them.

Inter-State obligations to prevent effluvium nuisances. — The vast extension of the petroleum trade and its refining factories, as developed on the New Jersey shore, has inflicted upon New Brighton, the front of the most populous and beautiful part of Staten Island, stench nuisances which the government of the State of New York has interfered with in the region of Newtown creek, where three cities were at once affected. It became necessary to devise ways and means by which the sanitary and judicial authorities of the two States should coöperate.

This somewhat difficult undertaking is now in progress with prospect of success, the chief capitalists in the refining of petroleum upon the Jersey shore, opposite New Brighton, having of their own part elected to submit to the State Board of Health of New York the decision of the question. What improvements shall be ordered and adopted to prevent effluvium nuisances from their factories?

This Board has accepted the duty thus indicated by request of the Attorney-General of New York, and the State Board of Health of New Jersey, and the local boards of Hudson county and the city of Bayonne, New Jersey, have united in the endeavor to secure all needed coöperation on the part of the judicial authorities of the respective States.

Though a part of the causes of the nuisance opposite Staten Island might be abated and prevented by interposition of the Federal courts as far as relates to the defilement and obstruction of the navigable waters of the Kill von Kull, between the two States, the chief evil

that would remain to be treated would be the direct emanations of effluvia from the refineries themselves.

If, in the progress of the effort now undertaken to secure the interposition and comity of judicial action by these two contiguous States respectively, the fact should appear, as we trust it will not, that a great nuisance, affecting the inhabitants of either one or both of these States, cannot be abated and prevented by such co-ordinated or reciprocal action, then certainly a specific act of the Legislature should be secured in each State to provide for such reciprocity of action without delay, as will attain the desired end.

The fact must not be overlooked that, as a result of the long-continued pressure of sanitary restrictions within the metropolis of New York, offensive industries and legitimate trades offensively conducted have been successfully crowded out from that city, not only into the cities and towns near by, in the State of New York, but along water sides of extensive districts, in the State of New Jersey, from which the citizens of the suburbs of New York now justly seek protection. These effluvium nuisances which have thus become established far beyond the city of New York furnish cogent reasons for the contiguous States and the neighboring municipalities, villages and towns securing the benign operation of equitable reciprocity in the enactment of laws for the protection of the public health and the prevention of public nuisances.

Effluvium nuisance from the starch and glucosery wastes. — Public complaints concerning stenches arising from the Erie canal, not only from Hamburgh street, Buffalo, to Tonawanda, but even from Tonawanda onward to Lockport, were made to the Governor, and by him referred to this Board during the summer of 1882. Similar complaints were made directly to this Board. These led to the examination into the alleged causes of the nuisances complained of. The result of the investigation was summarized as follows:

ALBANY, *August* 19, 1882.

To Hon. ALONZO B. CORNELL, *Governor:*

SIR — The undersigned have the honor to return to you the papers which you referred to this Board for investigation and report on the 5th inst. These consist of:

First. A formal complaint by the board of health of Lockport, accusing the Hamburgh street canal, a channel of the western terminal section of the Erie canal, of causing a nuisance intolerable and dangerous to health in the city of Lockport.

Second. A communication from the health officer of Lockport, distinctly accusing the glucose manufactories and distilleries of Buffalo of so emptying and washing away their waste materials, as to cause the stenches, etc., which emanate from the Erie canal at Lockport.

Third. A communication from Hon. E. W. Rogers, mayor (now ex-mayor) of Buffalo, urging the Governor to cause action to be taken under advice of the State Board of Health.

Fourth. A petition from village officials and other inhabitants of the villages of Tonawanda.

These several communications, dated on the 3d and 4th of August,

and in the autumn of 1881, have received the attention of this Board, as the following statement shows:

On the 9th inst. this Board directed its committee on drainage, sewerage and topography to proceed to Buffalo, Lockport and Tonawanda, there to investigate the facts relating to the sewage and waste matters by which the Erie canal is defiled, and its waters made to convey and emit foul emanations, offensive and injurious to the public health.

Investigation in Buffalo.— On the 15th inst. at 9 A. M., the committee of the State Board, as directed, begun its investigations, and at 11 A. M. proceeded with the mayor, the board of health, the health officer and city engineer, to examine the three glucose manufactories in that city. The two which were first visited are known as the American Grape Sugar Works, C. J. Hamlin, Esq., president and chief proprietor, and Dr. Geiseche, the superintending chemist. The first of these factories stands upon the bank of the Erie canal just north-west of the terrace. The second is situated on the southern bank of the Hamburgh street canal, near Chicago street. These two factories are managed under one capital and supervision, and are essentially alike. They are in operation day and night, and work up, according to the statement of Mr. Hamlin, about sixteen thousand bushels of Indian corn daily. All outflowing from each of these factories is conducted directly into the Erie canal or that section which is known as Hamburgh street. Such outflowing from them varies from three million to four million gallons daily, according to the statement of the responsible managers.

The third glucose manufactory is situated on Pratt street, in the eastern part of the city. It pours all its sewage and outflowing ultimately into Spring street sewer, thence into the Hamburgh street canal, a little way east from, and opposite to, Mr. Hamlin's glucosery No. 2. This third factory is the property of Dr. Firmenich. It is managed somewhat differently from the other two, and it pours into the canal daily from one million to a million and a half of sewage and washings.

Breweries.— Two of the largest breweries were examined, and the sewage and outflow from them inspected. The entire outflowing from the larger of the two was found discharging into open ditches that extend for a great distance in a sparsely-built-up region in the north-eastern section of the city. The proprietor and the inhabitants of that district regard the outflowing as a nuisance which ought to be controlled; but in an unsewered part of the city it has been suffered to exist hitherto. The amount of the sewage matter and waste is infinitely less than from the glucoseries. No other breweries and none of the distilleries were examined, nor were any of the starch factories inspected. One starch factory near Black Rock is known to discharge its waste and washings into the Erie canal. This will be reported upon at a future time. So important is it to report the chief sources of the inflowing of vegetable matter into the canal, ready to enter upon putrefactive decomposition, that the Board must limit its statement concerning the nuisances which it has investigated at Buffalo, to the three great glucoseries principally.

It is conceded and probably true that these three great factories for making glucose syrup pour into the canal vastly greater quantities of fluid than all the breweries, distilleries and starch factories in Erie

county; for it is conceded that the outflowing from the former exceeds four million gallons daily, and that it may exceed five million gallons. The managers of the glucoseries state that the greater portions of the glutinous waste matters are contained in about one thousand barrels of the "first washings" of the macerated material in the process of precipitating the starch.

Results of the investigation.—*In Buffalo* the condition of the Hamburgh street canal and of the Erie canal, of which the former is a mere *cul de sac* or elongated slip, was examined. A deposit of slimy filth, several feet in depth, along the western terminus of the canal, and the milky appearance of the water in the canal are striking facts, not only at Buffalo, but at Tonawanda, nearly twelve miles northward, and even at Lockport. The vast quantities of lake water which pass into the Hamburgh canal at various points, into the Main and Erie canal proper, northward within the limits of the city of Buffalo, do not greatly impair the density of the gray mixture which appears in the canal water as it flows onward toward Lockport. This is a color and quality of the canal water which no ordinary sewage matter ever imparts. It is not necessary to decide how much of it is due to the glucoseries, as it is not denied that it is largely derived from them.

This Board does not deem it necessary to recite all the statements volunteered by persons who attended at the inspection, and who undertook to argue that the glucoseries and starch factories had no share in producing this floating mass of finely divided vegetable matter that is found floating in the canal for thirty miles and upwards. Even the forty-eight million gallons of fresh water, which as the president of the Buffalo board states are daily poured into it from the lake on the south side of the canal, seem to have little influence in diminishing the milky and gray color, or thinning the slimy volume of water in the main canal within the limits of the city. In view of the facts here mentioned, and of the accusations which have been made by the Lockport board of health, it has been necessary to ascertain by inspection what the outflowing from the glucoseries consists of, and what is its probable amount daily.

In Lockport it was necessary to ascertain in what manner, at what times, and with what results the canal nuisance is suffered.

At the villages of Tonawanda, twelve to sixteen miles north from the glucoseries, it was necessary to ascertain precisely the bearing of the same facts as those investigated at Lockport.

The Board proceeded accordingly to obtain whatever facts were immediately attainable within and near these three places.

In Buffalo.— The Hamburgh canal extending from Hamburgh street on the east, where Little Buffalo creek enters as a sewer, to the Main street bridge, a distance of one and a quarter miles, is an enormous cess-pool,causing a stench-nuisance which is offensive for a great distance. Into it are poured the sewage and washings of two glucoseries, which work from ten thousand to sixteen thousand bushels of corn daily.

A little north-westward from the Main street bridge on the north bank of the canal proper stands the third glucosery, where from four thousand to eight thousand bushels of corn are crushed daily and subjected to the processes of glucose making. The washings and outflow-

ings from these three glucoseries are poured directly into the mass of filth and slime which constitutes a large proportion of the total volume of canal contents, not then offensive to the smell, but consisting of most putrescible material. These glucosery sewage matters and washings are thus placed in contact with the fermenting and seething filth of the canal, and are moved onward, toward Tonawanda and Lockport, at the rate of from one to three miles per hour.

Nature and quantity of the material thrown into the canal from the three glucoseries.—The starch, which is to be transformed into glucose, constitutes from fifty to sixty per cent of the total weight of the corn. Counting it, as is now usual, at from fifty-five to sixty per cent, the residue of every hundred parts weight of the corn consists of from twenty-five to thirty parts of glutinous, cellulose and various nitrogenized matters. The remaining ten to fifteen per cent would be classed as husky, woody and fatty matters. Out of the twenty-five to thirty per cent of glutinous and various other matters counted as nitrogenized, only a small percentage is saved in the processes of the factory. How much of them need not here be a question, as it is conceded that half or more of the twenty-five to thirty per cent of such residuary and more or less nitrogenized matter runs off into the canal as waste.

The total quantity by weight of corn substance which is daily thrown into the canal at Buffalo from the glucoseries alone is probably never less than ten per cent of the total weight of corn used, and it may exceed fifteen per cent. As before stated there are from twenty thousand to thirty thousand bushels of corn daily used in the three glucose factories, or from 700 to 840 tons. The ten to fifteen per cent of this vast quantity, which is daily cast into the canal as waste, is material of the most fermentable and putrescent of the corn substance, and its weight would be from 70 to 126 tons daily, estimated as solid corn-substance. The chemist of the American Grape Sugar Company testified that at least two per cent of glutinous materials escape in an insoluble form. This alone would be from fourteen to nearly seventeen tons of solid gluten daily. The same eminent authority also testified to the correctness of the well-known fact, that the alkaline treatment to which the whole mass of crushed corn is subjected carried away a great but unknown quantity of nitrogenized matter in a state of solution. So much for the nature and quantities of vegetable matter that is carried away in the sewage and washings from the glucoseries. It is simply an enormous quantity, sufficient to keep the canal waters filthy and in a state of fermentation for a distance of thirty miles on the course through Tonawanda and Lockport. For all practical purposes in deciding whether the glucoseries have a leading share in the putrescence that causes the stench that is complained of in the villages of Tonawanda, and in the city of Lockport, and by boatmen and workmen upon the canal for a distance of forty miles of its course, this concise statement should suffice, believing, as the undersigned do, that whatever share other manufactories and businesses, and the total outflowing of ordinary sewage in Buffalo may have, in the general defilement of the Erie canal, there need be no hesitation in concluding that it is this vast quantity of inflowing vegetable matter, ready to take on the most intense kind of putrefactive change, and to give

forth the most sickening and intolerable stench, that must first and separately be dealt with in reference to repression, abatement, and, as far as possible, total prevention.

Leaving this line of investigation as pursued at Buffalo, where after careful personal inspection there was a full and patient hearing given to all who had facts to present, the following results of investigation were obtained at Lockport and the village of Tonawanda:

At Lockport.— On the morning of the 16th inst., the board of health and a large assemblage of citizens received the committee of the State Board, who entered upon the hearing of evidence concerning experience in this city. The details of the testimony and proofs obtained at that hearing need not here be recited. Suffice it to say, the proof is conclusive that the inhabitants, and all who do business upon and near the Erie canal in that city, suffer greatly from an intolerable stench that varies in intensity and in an inverse ratio to the excess of the flow of water in the canal. In other words, in proportion to, *first*, the reversed flow of the Tonawanda river eastward from the section where the Erie canal enters the channel of the Tonawanda; and, *second*, in proportion as there is an excess of inflow of water from Lake Erie, at the city of Buffalo, when aided by winds or an unusual height of lake-water. The nature of the causes of the intolerable odor of the canal water at Lockport may be estimated fairly by the peculiarity of the stench from the slime in, and the appearance and color or opalescence of, the water. Other demonstrations of the nature of the cause of the stench need not be demanded in the present stage of the investigation, and for determining the first step in the duty of attempting to control such causes as are preventable.

At Tonawanda.— The proof is found to be incontestable, that in both villages, which are divided by the Tonawanda river and situated in the counties of Erie and Niagara respectively, the inhabitants have, for three or four years past, been suffering throughout the entire warm season and into the late autumn, from the same, but more intensely intolerable, stench which the board of health of Lockport and all the inhabitants complain of. That the public health in the villages and vicinity of Tonawanda is suffering seriously from this nuisance scarcely admits of a doubt. The appeal of the people there corroborates and greatly enforces the appeal from Lockport.

Conclusions and recommendations.— On behalf of the State Board of Health, the undersigned respectfully submit to the Governor that applying common sense to plain facts, and logical rules to the evidence as presented in this investigation at Buffalo, Lockport and Tonawanda, there should be no hesitation in holding responsible for the most essential and preventible causes of the stench nuisance at Tonawanda and Lockport, which is peculiar and of recent date; namely, within the last few years, and chiefly within the past three years,— the glucose and starch industries which use macerated corn in the separation and manipulation of starch.

Further, the evidence obtained in this investigation shows, that there are three stages, or subdivisions, in the manipulation of starch at the glucoseries, in the course of which the several and separate washings convey away the glutinous and other finely divided matters, that are in nowise repressed and prevented from being conducted into the Erie canal; that these successive washings are quite variously

burdened or dense with such fermentable and putrescent matters; that the first of these three washings contains the greater part of all the putrefactive material, which may be wholly disposed of; and that, in the judgment of the chemists and of persons of experience who have been consulted, the said matters may be mostly, if not entirely, repressed and rendered innocuous, and that the greater portion of them may be separated from the waste waters, that must, because of their vast quantity — from four to six million gallons daily from the glucoseries — ultimately flow into the canal or be carried into Lake Erie.

As it is inexpedient to adopt the latter course of outflow, on account of the necessity of preserving the purity of the waters at the head of the Niagara river, the complete repression of all organic matters until separated, or rendered entirely innocuous by chemical and chemico-mechanical treatment, appears to be an inevitable necessity, to be accepted and acted upon by the proprietors and managers of all glucoseries and starch factories which now turn their sewage and outflowing into the Erie canal.

Recommendations.— The logical sequence of the foregoing conclusions, which we present as the only recommendation that is necessary under the circumstances, and which need not await any of the exact chemical findings which the State Board is causing to be made, is, that each and all of the glucose and "grape sugar" manufactories, in the city of Buffalo or elsewhere, which are now discharging their sewage and waste outflowings into the Erie canal, directly or indirectly, should forthwith be required to repress, control, separate or render permanently insusceptible of fermentation and putrefaction, all and every kind of organic matter which is contained in the sewage and outflowings from the said factories.

"At a meeting of the Board, November 18, the chemical evidence was presented, and the following resolution thereupon adopted:

Resolved, That after a careful examination of the works at Buffalo by joint committees of this Board, and the chemical analysis of the various kinds of refuse, it is the opinion of the State Board of Health, that the pollution of this water by these factories is entirely unnecessary to the carrying on of their business, and may be completely obviated without in any way interfering with it."

The results of the chemical investigation are shown in the following statement:

Waste Liquors from Grape Sugar Works, Buffalo, N. Y.
(*Parts in* 100,000.)

	Reaction.	Unfiltered.		Filtered.		Solids in suspension.
		Solid residue.	Loss on ignition.	Solid residue.	Loss on ignition.	
AMERICAN GRAPE SUGAR CO.:						
Water from steeping tanks	Acid	1,735	1,470	1,499	980	236
Water from starch settlers	Acid	92	56	85	51	7
"Alkaline" water from starch tables	Neutral.	1,762	1,441	546	288	1,216
Water from washing starch	Neutral.	153	58	126	34	27
Wash-water from bone-black filter	Neutral.	124	32	79	35	45
BUFFALO GRAPE SUGAR CO.:						
Water from steeping tanks	Acid	2,588	1,991	1,740	1,000	848
Water from starch settlers	Neutral.	88	55	83	55	5
"Alkaline" water from starch tables	Neutral.	1,818	1,586	466	219	1,352
Wash-water from bone-black filters	Neutral.	1,254	1,030	1,154	919	100
FIRMENICH SUGAR REFINING CO.:						
Water from steeping tanks	Acid	567	446	402	356	165
"Alkaline" water from starch tables	Neutral.	1,536	1,357	336	133	1,200
Same acidified by sulphuric acid	Acid	2,218	2,011	703	349	1,515
Same after settling	Acid	817	497	.....*	.....*	....*
Wash-water from bone-black filters	Acid	1,456	1,384	1,342	1,238	114

* Quantity insufficient for determination, Oct. 31, 1882.

CONCLUSIONS BY THE COMMITTEE.

Thus far, the nuisances upon which this committee has reported in favor of action for their abatement and prevention by the Governor could not be reached and controlled, especially the causes of them and the persons responsible for the offenses resulting, by the local authorities of the communities which suffer most from them. The first of these sources of nuisances that have come under sanitary regulation were the great refineries of petroleum. The task they undertook has proved a difficult one, yet entirely practicable; and had not newly-established refineries failed to recognize the same obligations as the twelve which regulated their works under a trustworthy guaranty, this class of stench-producing factories would have been quite satisfactorily conducted.

This committee has endeavored to bring the new refineries under the same regulations as the others, and is now likely to succeed in the effort.

The permanent removal of the superphosphate works, the ammonia works and certain other sources of stenches in the Hunter's Point region, which were offensive across the East river for a great part of the width of the city of New York, has been accomplished without the intervention of court proceedings, or any violence to property, though aided in certain instances by the sheriff under peremptory orders

of the Governor. The offensive businesses and many an industry that is offensively managed along the margins of Newtown creek, and the vast swampy inland region at its head, have, from the time of their planting and expansion, been a gross nuisance to travelers upon the public thoroughfares, and to an extensive suburban region in Kings and Queens counties. If the local sanitary authority proves inadequate properly to regulate and prevent noxious effluvia from these numerous places, then, certainly, the authority vested in the State can be usefully interposed; yet in thus dealing with these unpleasant problems of sanitary policy and public decency, this committee bears in mind the fact, that the utilization of waste materials, animal and vegetable, which have to be taken away from the premises of the two millions of people that crowd the metropolitan cities and suburbs, is itself a most important sanitary necessity, and, for this reason, whenever this Board and the Governor have disturbed or laid restrictions upon any of these avocations, better ways and means of management have been studiously presented as an alternative previous to the invocation of such executive authority.

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SANITARY GOVERNMENT, PRINCIPLES AND FACTS.

[Abstract of a paper presented to the American Public Health Association at its Tenth Annual Meeting.]

By Hon. Erastus Brooks.

* * * * * * * * *

I speak now as a member of the State Board of Health, of one of the largest States of the Union, and as a citizen for many years in the State's service in the Legislature, and in its recent conventions for making and amending the fundamental laws of the State. I believe in the missionary work of education, through voyages of discovery for the detection of the causes of physical disease, for the exposure of vices, crimes, ignorances and neglects which injure, if not the souls, at least the bodies of men. I believe in voluntary, manly and benevolent service to perform this work. Professional service is wise, necessary and just, whether in the pulpit, where "the violated law speaks out its thunders," in the will, study and toil of the physician, whether selected to "minister to the mind diseased," or to the temple of the human body, where so many diseases are born, retained, transmitted, inherited, and in the labors of those appointed to make, administer, and consider the civil and criminal laws of the land.

These persons are all appointed for specific, intelligent, and responsible work, which engages the time and study of a million or more of its citizens. But I wish especially to speak of those mental and bodily interests which include not only this single million of teachers, but of the fifty millions, old and young, in the land not included in what is called professional work.

There is a higher law than professional service, born of the Giver of all good, implanted in the best thoughts and affections of men bearing the image of the Creator, and destined, if physical pain and misery are ever finally removed, to secure that end chiefly through the good will and good work of voluntary service, each working together in harmony for the preservation of life, health and human happiness.

THE PREVENTION OF AVOIDABLE DISEASES

is one of the first purposes of a wise government. The cure of bodily disease belongs to the physician, and latterly, happily for the State, the physician in unselfish methods of counsel and conduct endeavors to prevent disease and mortality in the best way that promises the removal of disease. He who saves a life, lessens a pain, or prevents a disease, is a public benefactor; and in this humane work the wise and faithful physicians take the lead. In the presence of such a truth it is not worth while for laymen, at least, to quarrel about schools or forms of medical practice, and all the more at this time, is this true as just now, the country, as never before, is engaged in this work of health education. As a layman, I am glad to see scientific sanitary discoveries more and more developed from year to year, under established forms of law, and when the law is complete, science and law thus embodied and united, the result will be for the common good and in its uses one of the best gifts of God to man. The death rate will yet be reduced to about one-half of its present proportions, and the infirmities of age, the inheritable diseases, and the accidents of life will become the only causes of death.

In a Dublin lying-in hospital eighty years ago infant mortality was reduced sixty-eight per cent simply by sanitary purification of the hospital and the hands of the hospital attendants. I have seen even a much larger saving of infant life than this in New York from like causes, and by additional care as to food, ventilation and cleanliness. If we could take in what past generations have communicated to the present, and the present often foreshadows the future, there would be amazement at past neglect and present ignorance and indifference in the saving of life and in the preservation of health. Let me then just here present, more for the audience outside of this chamber than for those within it, some facts which are the fruits of observation, study and experience.

First. While sanitary legislation is a public duty, sanitary instruction is the preliminary duty which will secure wise legislation. Lord Derby once said, and with great truth, that you cannot make a population cleanly or healthy against their will, and "where there is the will, there is the way," and the will and the way mean both private inclination and the power to apply it. Dr. Wm. Farr, of the English Registrar-General's office, embodying this higher law I have before referred to, has also said that "the hope of saving any number of human lives by hygienic appliances is enough to fire the ambition of every good man who believes in human progress." By these two methods definite human progress is made in all sanitary work and in science itself.

Second. The welfare and safety of the State are not only matters of paramount importance, reaching to all pursuits, occupations and em-

ployments of individuals, but the question of the public health takes by legal prescription precedence in this order of State work. In the case of the Commonwealth *v.* Upton, in one of the States, Merrick, Judge, has so decided under this ruling. I may add that recent facts demonstrate the truth that no form of government, local or general, can afford to neglect rules and regulations resting upon the public safety and needed for the prevention of disease or the promotion of health. Whether the death rate is ten, twenty, or more in each thousand people, depends upon the rule relating to public health, and this rule should become statute law.

Third. The best sanitary work is performed from the love of knowledge and the love of men. This statement is not a sentiment merely, but an established fact. Sanitary investigation and work in the past have added in longevity alone thousands of years to human existence and inestimable blessings to human comfort, and, judging of the future by the past, we may conclude, that this is but "the beginning of the end."

Fourth. Morally, as well as physically, it is true, that every thing in nature begets its kind. It is no more true that moulds and moisture are sources of disease and decay (the increased growth of which may be prevented and must be, if we would have healthy houses), than it is true that neutral disturbances come from moral and physical disturbances. In the one case, to secure the healthy home the damp, mouldy places of the homestead can be overcome by a simple process of fumigation with sulphur. By the same process, at times decomposition and putrefaction may be prevented. Certainly as much as this can be said of the proper treatment of the human body. Those two texts in Holy Writ, "Know ye not that your bodies are the members of Christ," "Know ye not that your body is the temple of the Holy Ghost," are as much sermons for a healthy body as for a moral life; and if the pulpit and the schools, the press and the forum would more frequently illustrate these texts to those whom they instruct and teach, there would be far more of physical education and improvement, and the schools would be vastly more advanced than they are at the present time.

Fifth. Education is at present defective. One class of children are forced or persuaded to attend our common schools to secure an education for future life, while another class of the same age, less fitted for work and needing education, are crowded for eight or ten hours in the factories and workshops of the country. Beyond this neglect, which is next to a crime, it is also true, that half of the diseases of children are either inherited or the direct fruits of vicious lives and bad examples.

The State may not freely correct this evil, but it can discuss it, expose it, and enlighten public opinion in regard to it.

Another source of danger to public health is to be traced to modern ideas of the necessity of what is called "advanced education for females," a kind of education in which hygiene has little or no part, though presented to the world as intellectual culture. Better would it be, in order to prevent this humane degeneracy, to give more attention to the health of the temple of the human body as the temple of the Holy Spirit.

In Germany, where so much attention is given to education, it is

said, ninety per cent of all the physical deformities that have come under the notice of physicians date from the time when the pupils attended school, and "the character of these diseases often correspond, it is declared, exactly with the position occupied by the children in writing."

Sixth. Disease also largely results from the lack of proper ventilation. From lack of proper light, let it be always remembered, the eyes are injured. Every little child, to be healthy, requires 2,000 cubic feet of pure air each hour, and the demand grows, according to age, up to 25,000 cubic feet for the adult.

The New York State Board of Health upon this one subject,— besides presenting a very able report from an expert scientist,— has issued a circular with sixty-eight special questions relating to light, heat, time and ventilation; and one of the most gratifying signs of the times is the general demand for copies of its reports and sanitary papers

Seventh. The half of the plagues in life come from what are known as infectious diseases and contagions, and these are controlled by remedies which practically stamp out what are known as general zymotic diseases. Living ferments is but one name for this source of disease. Many, if not most, of this class of bodily ailments,— as for example, measles, small-pox, and cholera,— originate outside of ourselves. But though these diseases spread fearfully, as a rule, they come but once in a lifetime. Not so with dyspepsia and rheumatism, which are often life-long tortures. No wonder that in our cities one-half of those who die, die under the age of five years, or that rheumatism, from which there is so much suffering, produces even degeneracy of race in families whose means are straightened. Intoxication is another cause, both of degeneracy of race, and at times of great mortality. Then comes the vices which belong to an inherited constitution for which children are not responsible; and this is just where the sins of the parents, by some mysterious Providence, are visited upon their children to the end of the third and fourth generation, if not to the end of time. It is just here also, for reasons too apparent to need comment, that parents in certain conditions of life may well pause before they consent to bring children into the world to inherit their own infirmities of the flesh. Better perpetual celibacy than diseased children.

The wonder, all things considered, is, not that so many children die, but that so many live, not that those whom the gods love die young, but that any of these children of poverty ever reach old age or middle life.

Eighth. In a just consideration of the health and mortality of the country, the subject of food must not be omitted. Men who make, or try to make, what are called "corners" in wheat, corn, and meats (to fill their own pockets with ill-gotten gains, with profits wrung from famishing people, who thrive as much by speculation upon the misfortunes of others as in their cultivated vicious skill in helping themselves), rarely take in the truth that death and disease are very often dependent upon dear food. The worst diseases and the largest number of deaths are seen where there are the highest prices of food.

Dr. Farr, in England, found that the death rate in the English population falls three per cent for each decrease of two shillings in the price of wheat. M. Messance, an eminent French writer, proves

the same fact, that the gauge of health is the cheapness of food I may add the kindred fact, that among the poorer classes, the number of marriages bears an inverse ratio to the price of wheat. Emigration also is sometimes governed by the price of breadstuffs in a direct ratio. The physical in connection with the mental symptoms of hunger or deprivation of food are stated by Mueller to be "feelings of general debility, actual and gradual loss of strength, fever, delirium and violent passions alternating with the deepest despondency." Suicides also increase with every definite crisis in agriculture.*

Crime may also be traced to dear food, and scientists have demonstrated the precise increase in mortality from this cause in Germany and elsewhere.

In the sick-room, and especially for the children there must be perfect nutrition, and yet how deplorably insufficient is the nutrition in the dwellings of the poor, the depraved and the negligent. One of the authorities before me declares that general distress and destitution in England increase crimes of all kinds,—very serious offenses and assaults excepted,—in the following ratio:

General crimes and distress	24 per cent.
Crimes against property with violence	50 "
Breaches of the peace, etc	90 "

While other writers make the percentage much less, all agree that cheap food is an element of order, comfort and contentment, and dear food produces the opposite result. In four years from 1878, the increase in the cost of grain was fifty per cent, in meats forty-four per cent, daily products seventy per cent, clothing twenty-six per cent, and in sugar and other articles from fifteen to twenty-one per cent. Mr. Grosvenor, of New York, also makes the comparative *per capita* increased cost from $81.40 to $111. The advance in food alone has been almost thirty-six per cent, and the increase in wages is not in proportion to the increase in cost of the necessaries of life. The food question is one that should be considered as well in its effect upon general health as from the standpoint of physiology and political economy.

Maxims and facts.— If there is to be any idolatry in this world, let it be the worship of pure air, water and of the sun as the source of light and enemy of filth.

When Lady Mary Wortley Montague, about one hundred and sixty years ago, as wife of the British Ambassador at Constantinople, learned that the Turkish villagers were in the habit of inoculating for smallpox she caused the operation to be performed upon her own child and subsequently introduced the practice into England. Two noble ladies also consented to be inoculated after this example. In this spirit thoughtful and capable men united in action when the cholera visited the land in 1866, when it was placed under control of enlightened sanitary authorities. In the same spirit, ten years since, the American Public Health Association was organized and the National Sanitary Conferences in 1857, '58, '59 and '60.

As a rule, health boards are unpaid officials, and their hardest work is to teach men how to keep in health, how to avoid disease, how to

* See Moeselle on the increase of suicides in Italy, England, France, Austria, Sweden and Germany generally.

take care of children, families, dwellings and work-shops and last, not least, not neglecting the beasts of the field, as the faithful bearers of so many of our burdens and the source of so much real personal comfort.

In regard to this subject of animal life and disease there is occasion for constant vigilance. Animal refuse of all kinds may be the source of disease.

Supplementary notes by Mr. Brooks read at same meeting

The New York State Board of Health

was organized in June, 1880, and was charged not only with the administration of the organic law which created it, but with all statutes relating to sanitary administration then in existence. Its membership is limited to three State Commissioners of Health, appointed by the Governor and Senate, three appointed by the Governor alone to represent sanitary government in large cities, and three *ex-officio* officers, namely: The Attorney-General, the Director of the State Survey and the Health Officer of the Port of New York. The Board at once organized several standing committees, issued a manual of State laws, and as soon as possible addressed itself to the local governments in the twenty-four cities, three hundred and forty-one villages, nine hundred and forty-seven townships and sixty boards of county officers within the State. To this large work it soon added the more laborious service of addressing the eleven thousand four hundred and forty school districts in the State, making all in all a communication with twelve thousand seven hundred and ninety-four organizations. Constant knowledge of and communication with all these official bodies has become a public necessity, and additional correspondence with medical and official persons increases the total to fourteen thousand three hundred persons or bodies. All of this number perform duties relating to the health of the people and the sanitary condition of communities. The more important duties of the Board may be classed under the following ten heads:

First. Organizing and instructing local boards of health — sanitary boards.

Second. Sanitary instruction to the people.

Third. Investigation of complaints and petitions.

Fourth. Expert work of selected medical investigators and the reports to the Board by these experts.

Fifth. Enforcing and testing laws and practices relating to the public health.

Sixth. Sanitary care and control of public institutions and schools.

Seventh. Causes of, and remedies for, small-pox, diphtheria, etc.

Eighth. External and internal conditions of the public health with the duties of local boards of health in registration, vaccination and in vital statistics.

Ninth. Investigation of endemic, epidemic and all contagious diseases.

Tenth. Drainage, sewerage and domestic hygiene.

All these subjects are constantly before the State Board, and involve a vast amount of labor on the part of the Secretary and his assistants.

In a continued work of investigation the State Board has also exposed the stench nuisances in many parts of the Commonwealth and required their removal, especially in the manufacture of petroleum and

superphosphate fertilizers. In these and kindred industries, over forty millions of capital are employed. All these industries and the people complaining of them have had a patient hearing, and the causes of offense have been largely removed. Nine-tenths of the stench nuisances in and near the cities of New York and Brooklyn have been abated or the business forced out of existence.

Apart from this kind of work, more than twenty miasmatic and malarial swamps and ponds have been examined by experts under direction of the Board, or on the call of the Governor of the State for information. Portions of the abandoned canal have received the same care and with the best results.

Beyond this kind of work the Board, upon earnest call of the people, have visited different parts of the State where their presence and advice were asked for and needed. The Board have issued some sixty different circulars, papers and documents relating to the public health. These papers together include 360 pages of closely printed and useful matter.

The work of the Board has been in constant advance of the requisitions of the State statutes. In discussions, writings and appeals, its action covers all material questions relating to miasma, contagion, exposure, drainage, sewerage, and the sanitary condition of all classes and conditions of people, and especially in what belongs to school houses and children in the schools.

As a satisfactory record of the progressive work of the Board, about one thousand town or local boards of health have been established, and the whole people and the whole area of the State have been studied, especially in localities where disease has prevailed or been threatened. All that belongs to practical chemistry, whether in the laboratory or beyond it, in questions of health, have been called into service under the one or the other of two recent State laws relating to questions of health. For this special work the State has been divided into three districts, for the analyzing of water, food, drugs, illuminating oils, etc., with four chemical laboratories and four analysts, and one inspector.

Such a work, in which more than five millions of the people are interested, may be said to have no end, or, at least, to require constant care and vigilance.

General Conclusions.

I. In seeking sites for homes or business, all ill-drained and low-lying districts should be avoided, as these are the sources of typhoid fevers and malarial diseases.

II. As it is in evidence in England, Russia and elsewhere, that tens of thousands of lives have been saved by proper quarantine, management and treatment of diseases, encouraged and protected by governments that value human life and health, there ought to be in our Federal government a permanent Bureau of Health. Where material interests receive so much attention, and more than 100,000 government agents are paid to provide for them, something is due to the mental and bodily interests of the whole people. Sanitary organizations are essential for the towns, the States and the Federal government.

III. As a general rule there should be unity of action in the supply of drinking water for the people in all large villages and in the cities. The same united action should exist in regard to sewerage and drainage. Dean Stanley's death, it is said, was due to the condition of the trunk sewer and house-drainage in the district where he lived.

IV. Sanitary administration means not only personal comfort and health in the family, but economy to the State and the family. Two hundred and fifty thousand lives lost, three million cases of sickness and $20,000,000 in money are traced, in one decade in England alone, to neglect of sanitary care. The sword and musketry are terrible ministers of death; but even in armies, where battles kill one person, disease kills at least three. At one time, the death rate in India was sixty-nine in a thousand, but in the last decade by wise sanitary administration it has been reduced more than two-thirds with a corresponding increase of wealth and every worldly comfort. Such a record renders comment needless.

V. Schools should all be under the inspection of local boards of health. They are often the radiating centers of the diseases of children. Where a child is found sick in school or other public place, the house should be visited.

Hospitals and charitable institutions should be limited in the numbers allowed to be received, to prevent crowd poisoning and the spread of disease among inmates.

VI. Domestic isolation and quarantine are best where there are intelligent nurses, and willing or intelligent people to be cared for. Cleanliness of person and of clothing and the frequent change of apparel, the removal of every thing offensive and the non-use of the same vessels for food or drink are the only "charms" that ward off contagions.

If possible let there be but one nurse and a free current of air in cases of real sickness. In twenty years' experience, I have known at least one nurse who always kept every case of disease from the other members of the family. Home treatment in all cases is, as a rule, safer than the best hospital care, necessary as at times the latter may be.

[M.]

THE PERMANENT SERIES OF SANITARY DOCUMENTS

ISSUED BY THE

STATE BOARD OF HEALTH.

AN ACT TO ESTABLISH A STATE BOARD OF HEALTH.

CHAPTER 322, LAWS OF 1880.

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

State Board of Health, how constituted.

SECTION 1. Within twenty days after the passage of this act the governor shall appoint, by and with the advice and consent of the senate, three State commissioners of health, two of whom shall be graduates of legally constituted medical colleges and of not less than seven years' practice of their profession. The said commissioners, together with the attorney-general, the superintendent of the State survey and the health officer of the port of New York, who shall be ex-officio members of the State Board of Health, and three other persons to be designated and appointed by the governor, one of whom shall be a commissioner of health of the Board of Health, of the city of New York, and the others shall be members or commissioners of health of regularly constituted and organized Boards of Health of cities of the State, shall constitute the Board of Health of the State of New York. Nothing in chapter three hundred and thirty-five of the laws of eighteen hundred and seventy-three of the State of New York or in the laws amending the same, or in the laws constituting Boards of Health in the various cities of the State, shall be read or construed to prevent the appointment of the said commissioners of Board of Health of cities also members of the Board of Health of the State of New York, and no appointment to an office, or acceptance thereof under this law, shall be held to vacate the office previously held in any Board of Health of any city in the State.

Oath of commissioners.

Term of office.

§ 2. The said three commissioners so appointed shall take the oath of office prescribed by the constitution for State officers, and receive from the secretary of State certificates of their appointment. They shall hold office for three years, and whenever a vacancy occurs, the place shall be filled as in other cases provided by law, and the other commissioners shall, from time to time, be designated by the governor as occasion may require, or as their places may be vacated in the Board by the expiration of the several terms of office.

Vacancies, how filled.

Meetings of board.

§ 3. The State Board of Health shall meet at least once in every three months and as much oftener as they shall deem necessary, their first meeting being held in the city of Albany within two weeks after the appointment duly made of the members of the first Board and after they shall have qualified as aforesaid, and each annual meeting shall be held within two weeks after the first of May each year after the first as herein provided. No member of the Board except the secretary shall receive any compensation, but the actual traveling and other expenses of the members and officers of said Board while engaged in their duties shall be allowed and paid out of the appropriation made for its support. They

Traveling expenses, etc., of commissioners to be paid.

shall elect annually one member of the Board to be president; they shall also elect from among their own members or otherwise, a person of skill and experience in public health duties and sanitary science, to be the secretary and executive officer of said Board, who shall have all the powers and privileges of a member of the Board except in regard to voting upon matters relating to his own office and duties as secretary, and he shall hold said office for the term of three years, but he may be removed for cause after a full hearing by the Board, a majority of the members voting therefor.

President to be annually elected.

Secretary to be executive officer, and to hold office three years.

§ 4. The State Board of Health may adopt by-laws regulating the transaction of its business, and provide therein for the appointment of committees to whom it shall delegate authority and power for the work committed to them, and it may also adopt and use an official seal. Five members shall constitute a quorum for the transaction of business.

Board may adopt by-laws. Seal. Quorum.

§ 5. The secretary shall keep a record of the acts and proceedings of the Board, perform and superintend the work prescribed in this act, and such other duties as the Board may order, and shall receive an annual salary of three thousand dollars, which shall be paid him in the same manner as the salaries of other State officers are paid, and such necessary expenses shall be allowed him as the comptroller shall audit on the presentation of an itemized account having vouchers annexed, together with the certificate of the Board.

Duties and compensation of secretary.

§ 6. Said Board shall take cognizance of the interests of health and life among the people of the State, they shall make inquiries in respect to the causes of disease, and especially of epidemics, and investigate the sources of mortality, and the effects of localities, employments and other conditions upon the public health. It shall be the duty of said Board to obtain, collect and preserve such information relating to deaths, diseases and health as may be useful in the discharge of its duties, and contribute to the promotion of the health or the security of life in the State of New York. And it shall be the duty of all health officers and Boards of Health in the State to communicate to said State Board of Health copies of all their reports and publications; also such sanitary information as may be useful.

General duties of Board.

§ 7. It shall be the duty of the State Board of Health to have the general supervision of the State system of registration of births, marriages and deaths, and also the registration of prevalent diseases. Said Board shall prepare the necessary methods and forms for obtaining and preserving such records, and to insure the faithful registration of the same in the several counties, and in the central bureau of vital statistics at the capitol of the State. The said Board of Health shall recommend such forms and amendments of law as shall be deemed to be necessary for the thorough organization and efficiency of the registration of vital statistics throughout the State. The secretary of said Board of Health shall be the superintendent of registration of vital statistics of the State. As supervised by the said Board, the clerical duties and safe keeping of the bureau of vital statistics thus created shall be provided for by the comptroller of the State, who shall also provide and furnish such apartments and stationery as said Board shall require in the dis-

Board to have supervision of vital statistics of State, and to recommend necessary legislation.

Board to prepare forms for, and regulate use of, transfer permits.

charge of its duties. And the State Board of Health shall also prepare the necessary methods and forms and prescribe the rules regulating the issue and use of transfer permits, with the proper coupons attached thereto, to be issued by local organized Boards of Health, for the transportation of the dead bodies of persons which are to be carried for burial beyond the limits of the county where the death occurs; and in all cases, the State Board of Health shall require coupons to be attached to such permits, to be detached and preserved by every common carrier, or the person in charge of any vessel, said railroad train or vehicle to whom such bodies shall be delivered for transportation. Any violation of such rules and regulations shall be a misdemeanor.

Violation of regulation a misdemeanor.

Governor may require Board to examine and report on nuisances, etc.

Report, where to be filed.

§ 8*. At any time the governor of the State may require the State Board of Health to examine into nuisances affecting the security of life and health in any locality, and in such cases, said Board of Health shall have all necessary powers to make such examinations, and it shall report the results thereof to the governor, within the limits of time prescribed for such examination and report. The report of such examination, when approved by the governor, shall be filed in the office of the secretary of State, and the governor may, in relation to things found and certified by the said Board of Health to be nuisances, declare them to be public nuisances, and order them to be changed, as he shall direct, or abated and removed. And such order shall be persumptive evidence of the existence of such nuisance, and all persons maintaining, or assisting to maintain, or aiding and abetting, in any manner, in the maintenance of such nuisance, after notice of such order, shall be guilty of a misdemeanor, punishable by fine not to exceed one thousand dollars, or imprisonment in the county jail of the county in which such nuisance is maintained, not to exceed one year, or by both such fine and imprisonment. In such cases, when such order has been made, the governor may, by his further order in writing, certified under his official seal, require the district attorney, the sheriff, and the other officers of every such county to take all necessary measures to execute and to obey the order of the governor; and any act of any such county officers in the abatement of any such nuisance, so declared, which shall be reasonable or necessary for the execution of such purpose, shall be lawful and justifiable, and the order of the governor shall be their protection. The expense of the abatement of such nuisance shall be paid by the county in which such nuisance occurs, and such expense shall be a charge or a lien upon the lands maintaining such nuisance, and shall be a valid claim on behalf of said county against all persons maintaining the same, or assisting in the maintenance thereof; and the lien and claim thus created may be collected by action to recover against either or all of the persons liable to pay the same, and may also be enforced by action to enforce the lien upon the lands maintaining the nuisance, by a sale thereof, to satisfy the same.

Governor may order nuisances abated.

Violation of order a misdemeanor.

Dist. attorney, sheriff and other county officers to cause the execution of the governor's orders.

The county to be responsible for costs, which shall be a lien on property of offenders.

*As amended by chapter 308, Session Laws of 1882.

When local Boards to be represented at deliberations of State Boards.

§ 9. At any time at the request of the State Board of Health, or whenever the governor shall, as hereinbefore provided, have directed an examination and report to be made by the State Board of Health into any alleged nuisance, any Board of Health of any city of the State may appoint and select any one of its officers as its representative, during such examination of any nuisance, and such representive officer shall have a seat at, and be entitled to take part in, all the deliberations of the State Board of Health, during such investigation, but without the right to vote.

Board may employ experts and examine structures and places.

§ 10. Said Board may, from time to time, engage suitable persons to render sanitary service, and to make or supervise practical and scientific investigations and examinations requiring expert skill, and to prepare plans and report relative thereto. And it is hereby made the duty of all officers and agents having the control, charge or custody of any public structure, work, ground or erection, or of any plan, description, outlines, drawings or chart thereof, or relating thereto, made, kept or controlled under any public authority, to permit and facilitate the examination and inspection, and the making of copies of the same by any officer or person by said Board authorized; and the members of said Board, and such other officer or person as may at any ume be by said Board authorized, may, without fee or hindrance, enter, examine and survey all grounds, erections, vehicles, structures, apartments, buildings and places. But no more than five thousand dollars in any one year shall be expended for such special sanitary service.

Limitation of amount to be expended for expert service.

Time of annual report.

§ 11. It shall be the duty of said Board, on or before the first Monday of December in each year, to make a report in writing to the governor of the State, upon the vital statistics and the sanitary condition and prospects of the State; and such report shall set forth the action of said Board and of its officers and agents, and the names thereof, for the past year, and may contain other useful information, and shall suggest any further legislative action or precautions deemed proper for the better protection of life and health. And the annual report of said Board shall also contain a detailed statement of the comptroller of all money paid out by or on account of said Board, and a detailed statement of the manner of its expenditures, during the year last past, but its total expenditures shall not exceed the sum of fifteen thousand dollars in any one year.

Appropriation for expenses.

§ 12. The sum of fifteen thousand dollars is hereby appropriated from the general fund for the purposes of this act, and the expenditures properly incurred by authority of said Board and verified by affidavit, subject, however, to the limitations hereinbefore imposed, and shall be paid by the treasurer upon the warrant of the comptroller.

§ 13. This act shall take effect immediately.

[No. 25.]

STATE BOARD OF HEALTH OF NEW YORK.

THE AMENDED PUBLIC HEALTH LAWS. POWERS AND DUTIES OF LOCAL BOARDS.

To Local Boards of Health and Health Officers:

The State Board of Health herewith presents copies of the Health Laws, as consolidated and amended in chapters 351, of 1882, and 431 of 1881. The powers and duties of all local sanitary authorities are clearly defined, and the relations of the local boards to the State Board of Health, and to the registry of vital statistics, established. The recent amendments have touched only those points which are essential, and which the best legal advisers have shown to be necessary.

The eight general statutes and amendments are now so consolidated under chapter 431 of 1881, and chapter 351 of the Laws of 1882, relating to local health government, as to constitute one connected and harmonious law, as appended to this circular and marked [25 *a*]. This law provides for:

(1.) The organization and constant maintenance of a local board of health in every town, city, and incorporated village.

(2.) Trustworthy and responsible membership of the board, the filling of vacancies, and for a continuous service by each board.

(3.) It requires the board to define the powers, and fix the compensation of a competent health officer.

(4.) It gives to the board ample authority over the preventable causes of contagious and infectious diseases.

(5.) It requires the board to make regulations against nuisances and other causes of danger to the public health.

(6.) It authorizes the board, by an appointed officer or other person to enter upon any premises or place, to make necessary sanitary examinations (and for no other purpose).

(7.) Each board of health is required —

(a.) To receive and examine into the nature of complaints concerning causes of danger and injury to the public health.

(b.) To report to the State Board of Health facts concerning infectious and epidemic diseases.

(c.) To take charge of, and provide for, the quarantine of cases of contagion and its sources.

(d.) To provide for the care of destitute and dangerously infectious persons.

(e.) To report every case of small-pox, and to provide the means for thorough and safe vaccination of those who may need it.

(f.) To supervise the registration of deaths, diseases and causes of death; to examine all certificates and records of death, and returns of coroners.

(g.) To designate persons who shall grant permits for burial.

(h.) To supervise and make complete the registration of deaths, births and marriages.

(i.) To publish necessary regulations and orders of "general obligation."

(j.) To make and enforce any special order without such publication, to meet an emergency not provided for by regulations of "general obligation."

(k.) To compel compliance with, and if need be to execute, their orders; and in such procedures to issue warrants to constables, and if necessary, to the sheriff, to bring to the board's aid the power of the county. Such warrants to have the same force as if issued out of any court of record.

(l.) To employ any necessary aid to enforce the execution of the orders and regulations published and made; to impose penalties for non-compliance therewith, and to obtain judgment and fix liens for the payment of work executed by the board.

(8.) The law also provides that the State Board of Health shall notify local boards to meet for reasons given, and to take action against causes of danger to the public health; also to give notice of any neglect in the registration of deaths, births and marriages, and the burial of the dead; and in case of continued neglect to enforce the registration laws, after three months' notice, to take control of said registration wherever it so continues to be neglected by the local authorities, until they shall agree to and actually make the said records and registry complete as required by law.

(9.) Any refusal or willful neglect on the part of any person to comply with the laws and regulations for such registration is declared to be a misdemeanor, punishable in any court of competent jurisdiction; and the State Board of Health may appear as the complainant in the prosecution of such a misdemeanor when by the fault or refusal of any local board or officer.

Peculiar Nature of the Statutes relating to Health and Registration.—These laws were at first generally "*permissive*," and carefully designed to enable each town, and other civil division for local government, to guard the interests of health and life. They are now strictly *obligatory*, and must be complied with, though penalties may be enforced and the neglected work be executed at the cost of the delinquents only as the last resort. The necessary information, official advice and means are now offered, and, after suitable notification, the laws must henceforth be faithfully complied with and impartially enforced.

To secure general compliance with these laws it is necessary that all local sanitary and registering officers, as well as the State Board of Health, shall con-

tinue to give notice to all classes of people concerning these duties, and the rules and regulations for the same; the prescribed methods, forms and times for specified duties under the laws; the penalties for neglect or refusal to comply with said laws and regulations; and concerning reasons and beneficent results of thorough compliance. In no other branch of local government and the general administration of obligatory laws is there such occasion for instruction and explanation as in this of the safe-guarding and registry of the lives of the people.

Sanitary Responsibility.—The local boards and the State Board of Health are officially responsible for the administration of these laws, while the health officers, physicians, clergymen, magistrates, householders and parents, owners and occupants of premises, and all persons having responsibility in the management of any business or property which affects public health, are subject to these obligatory statutes, and any willful neglect or violation of the regulations and orders, made in accordance therewith, is by the laws required to be treated as a misdemeanor.

The Duties of Local Boards of Health may be enumerated as follows:

To guard the community and every family against infectious and epidemic diseases, and wholly to prevent the spreading of small-pox.

To provide for the regular isolation or domestic quarantine of any acute, contagious disease which occurs in the community, and to extinguish the contagion.

To discover and remove preventable causes of disease, especially those that are localized, such as those of filth and malaria. To this end, to place on duty a most competent physician, as Health Officer, and maintain an efficient system of sanitary inspection, reports, notifications and orders.

To supervise and make complete the records and registry of deaths, diseases and burials, and of births and marriages.

To keep the inhabitants well-informed concerning preventable causes of sickness and mortality, and to provide timely information of the necessary means for protecting life and health.

PROTECT and **SAVE** are watchwords of the Health Officer, and the fact should be everywhere understood that **public health is public wealth, and that it is essential to the happiness and virtues of the people.**

Respectfully submitted on behalf of the Board.

ELISHA HARRIS, *Secretary.*

[No. 25.][a]

State Board of Health of New York.

ORGANIZATION, POWERS AND DUTIES OF LOCAL BOARDS OF HEALTH.

The State Board of Health invites the attention of Local Boards of Health in Towns, Villages and Cities to this recently amended statute, defining the powers and duties of Local Sanitary Officers.

AN ACT for the Preservation of the Public Health.

[**The amendment in 1881, chapter 431, Session Laws, is here printed in** *italics*. **The words in black letters have been added by the amendments made in chapter 351 — of 1882.** The other portion, in common type, comprises what remains of the original act of 1850.]

§ 1. It shall be the duty of the common council of every city *in this state, except in the cities of Brooklyn, New York, Yonkers and Buffalo, which are hereby excepted from the operation of this act, to appoint a board of* health for such city to consist of six persons who are not members of said *council, and who shall be appointed as follows: Two persons for a term of one year; two persons for a term of two years; and two persons for a term of three years; (one of whom, at least, shall be a competent physician). The mayor of such city shall be a member ex-officio of such board of health, and shall be president thereof. The said board of health, when duly organized, shall appoint a competent physician (not a member of such board) who shall be health officer for such city. This section shall not be construed to remove any of the existing boards of health in any of the cities of this state, but the successors of such boards shall be appointed as in this section provided. Upon the expiration of the term of office of any member of the board of health, appointed as herein provided, his successor shall be appointed by such common council for the term of three years, and the said common council shall also have power to fill any vacancy caused in such board of health by the death, resignation or removal from the city of any member thereof. And it shall be the duty of the trustees of every incorporated village in this state in which there is not now a board of health duly organized, to appoint once in each year a board of health for such village, to consist of not less than three nor more than seven persons (who are not village trustees), who shall hold office for one year, or until their successors shall have been appointed, from which board shall be elected a president and secretary; and the said board of health thus constituted shall appoint a competent physician to be the health officer of such village, who shall not be a member of said board of health.*

Constitution of City Boards of Health.

Health Boards of Villages.

§ 2. The supervisor and justices of the peace and the town clerk, *or a majority of them, of each town in this state, together with a citizen of such town, of full age to be elected by them, shall be the board of health for such town for each year, and they shall appoint some competent physician not a member of said board, to be the health officer for such town. They shall have cognizance of the causes of injury or danger to the public health, and shall meet upon call of the supervisor. Also, whenever in the judgment of the state board of health, or (if the said board be not in session), of the president and secretary thereof, it shall be necessary, and the public good requires it, the supervisor of such town upon reasonable notice being given him from the state board of health, or its president and secretary, shall immediately convene the town board of health, by notice to the members thereof, to take such proceedings as the public health in that vicinity may require, and concerning which it shall have been notified by the state board of health, or by its president and secretary. And in any case in which the term for which the board of health of any village or city heretofore appointed shall have expired, or in any case in which a member or several members of a board of health of any town, village or city in this state, shall resign or cease to act officially, so that less than the statutory number of members of said board continue to be members thereof, then it shall be the duty of the county judge of the county in which such town, village or city is situated, or of an adjacent county upon being satisfied that such term has expired or that such vacancy or vacancies exist, to appoint in writing a competent citizen or citizens, as the case shall require to fill such vacancy or vacancies, and to perform the duties of said office within the time specified, and until the said town, village or municipal government shall have elected*

Membership and organization of Town Boards of Health.

Temporary vacancies how filled.

or appointed the member or members, who shall, according to law, perform such official duties in the said board of health. The written appointment to a board of health, made by a county judge under this section shall forthwith be filed in the office of the clerk of the county in which said board of health is located. Any violation of the provisions of this section or of any lawful instruction of said state board of health shall be a misdemeanor.

§ 3. The several boards of health now organized in any city, village or town in this state (*except in the cities of New York and Brooklyn*), and the *several boards of health constituted under this act as amended, shall have power and it shall be their duty:*

(1.) To meet in their respective cities, villages and towns and fix and determine the period of quarantine to which vessels, vehicles or persons arriving in such city, village or town shall be subject; but the said board shall have power, after an examination, to reduce the period of quarantine of such vessel, vehicles or persons, if they deem it safe to do so.

Prescribed duties of health officer.

(2.) To prescribe the duties and powers of the **local** health officer; to direct him from time to time in the performance thereof, and to fix the compensation he shall receive.

Powers to regulate quarantine, etc.

(3.) To make orders and regulations in their discretion concerning the place and mode of quarantine, the examination and purification of vessels, boats and other craft not under quarantine; the treatment of vessels, articles or persons thereof; the regulation of intercourse with infected places; the apprehension, separation and treatment of emigrants and other persons who shall have been exposed to any infectious or contagious disease; the suppression and removal of nuisances, and all such other orders and regulations as they shall think necessary and proper for the preservation of the public health; **also to enter upon or within any place or premises where conditions dangerous to the public health are known or believed to exist and by appointed members or persons to inspect and examine the same, for the protection of life and health, and for no other purpose, and all owners, agents and occupants shall permit such sanitary examinations; and it shall be the duty of said board of health to furnish said owners or occupants a written statement of results or conclusions of such examinations.**

Local board may enter, examine and report upon any premises.

To regulate isolation of and intercourse with infected persons and places.

(4.) To regulate and prohibit or prevent all communication or intercourse with all houses, tenements and places, and the persons occupying the same, in which there shall be any person who shall have been exposed to any infectious or contagious disease.

(5.) *Such board of health shall have power, and it shall be its duty, to receive and examine into the nature of complaints made by any of the inhabitants, concerning causes of danger, or injury to the public health within the limits of its jurisdiction; also to report to the state board of health, promptly, facts which relate to infectious and epidemic diseases within said jurisdiction, and to require such isolation and quarantining of persons, vessels and sources of infection, as shall be in its judgment necessary; also to release from such isolation or quarantine, such persons, vessels and things, as it shall deem safe so to release; but upon ordering such quarantining or isolation, or such release from the same, said board and its health officers shall make a record of the facts in the case, and of the reasons for the action taken. It shall also be the duty of the said local board* to procure suitable places for the reception of persons, *and things infected with* malignant, contagious or infectious diseases, and in all cases where sick persons cannot otherwise be provided for, to procure for them medical, and other attendance and necessaries; *and it shall be the duty of every such board of health to take cognizance of, and report, every case of small-pox or varioloid, occurring within said board's jurisdiction, also to make all needful provisions for immediately obtaining the necessary means for thorough and safe vaccination of all persons within the said jurisdiction who may need the same. It shall also be the duty of the board of health in each town, village and city in this state, to have the supervision of the registration of deaths, diseases and the causes of death, and by its appointed officers, to examine all certificates and records of death, and findings of coroner's juries, and to designate the persons who shall grant permits for the burial of the dead, and to prescribe sanitary regulations for*

Board to make a report of facts, and a record of its orders and acts.

To provide public vaccination.

The Board, supervision and duty of registration of vital statistics.

such burials; and there shall be no burial of any dead person until a certificate of the death and its causes, if known, shall have been made and presented as required by the laws of this state, and until thereupon a permit for burial shall have been given as provided by said laws; *and it shall be the duty of every such board of health to supervise and make complete the registration of births, deaths and marriages within the limits of its jurisdiction, and in so completing the said registration the cost thereof shall be a charge upon such town, village or city, and shall not exceed fifty cents for each completely verified and registered record of a birth, death or marriage, but the town clerks and the registering clerks provided by law in villages and cities may still keep all records of births, deaths and marriages as required by chapter five hundred and twelve, laws of eighteen hundred and eighty;* and in any place in this state in which the state board of health ascertains that said registration is not completely and well made, said state board shall notify the local board of health and the registering clerk, whose duty it is to make the registration in such place, that within three months from the date of such notice, said defects and neglect in the records must be amended and prevented. If at the expiration of the time mentioned said neglect and defects are not overcome and prevented by said local authorities, it shall be the duty of the state board of health to take such control of, and adopt such means for causing compliance with rules and regulations for the said records, as will secure their completeness and proper registratien within the limit of cost hereinbefore specified, and until the said local officers shall agree to and actually make the said records and registry complete as required by law; any refusal or willful neglect on the part of any person whose duty it is to make out or file for registration any record or records as aforesaid, and any officer or board that shall neglect or refuse to register and preserve said records as required by law, shall be deemed guilty of a misdemeanor, and may be prosecuted in any court of competent jurisdiction.

The cost per record not to exceed fifty cents.

State board shall take control to remedy neglects and enforce compliance for a time.

(6.) To publish from time to time all such orders and regulations of general obligation as they shall have made, in such mannner as to secure early and full publicity thereto; and to make, without publication thereof, such orders and regulations in special or individual cases, not of general application, as they may see fit, concerning the suppression and removal of nuisances, and concerning all other matters in their judgment detrimental to the public health, and to serve copies thereof upon any occupant or occupants of any premises whereon any such nuisances or other matters aforesaid shall exist, or by posting the same in some conspicuous place on such premises.

Orders and regulations to be published.

(7.) To issue warrants to any constable of their respective cities, villages or towns, to apprehend and remove such persons as cannot otherwise be subjected to the orders and regulations by them adopted; and, whenever it shall be necessary to do so, to issue their warrant to the sheriff of their respective counties to bring to their aid the power of the county; all which warrants shall be forthwith executed by the officers to whom they shall be directed, who shall possess the like powers and be subject to the like duties in the execution thereof, as if the same had been duly issued out of any court of record in this state.

Power to issue warrants.

(8.) To employ all such persons as shall be necessary to enable them to carry into effect the orders or regulations they shall have adopted, published and made, and the powers vested in them by this act, and to fix their compensation.

Employment of agents.

(9.*) To impose penalties for the violation of, or non-compliance with, their orders and regulations, and to maintain actions in any court of competent jurisdiction to collect such penalties, not exceeding one hundred dollars in any one case, or to restrain by injunction such violations, or otherwise to enforce such orders and regulations.

Boards of Health may impose and enforce penalties or restrain violations by injunctions.

* Added by § 1, chapter 559, Laws of 1870.

Violating orders of Board a misdemeanor; penalty.

§ 4.* Every person who shall willfully violate or refuse to obey any order or regulation so made and published, or any order so made and served, or posted as aforesaid, shall be deemed guilty of a misdemeanor, and on conviction thereof, shall be subject to fine or imprisonment, or both, in the discretion of the court, such fine not to exceed one thousand dollars nor such imprisonment **six months.** And in any case of non-compliance with any order or regulation which shall have been so served or posted, as provided in subdivision six of section three of said act as hereby amended, the said board or its servants or employees may lawfully enter upon any premises to which such order or regulation relates, and suppress or remove the nuisance or other matters in the judgment of said board detrimental to the public health mentioned in such order or regulation, and any other nuisance or matter of the description aforesaid found there existing; and the expense thereof shall be a charge upon the occupant or any or all the occupants of said premises, and may be sued for and recovered with costs by said board in the name of such board in any court having jurisdiction. Whenever execution upon any judgment so obtained shall have been returned wholly or in part unsatisfied, said judgment, for the amount so unsatisfied, shall be a lien upon said premises, having preference over all other liens or incumbrances whatsoever. But in order to acquire such lien, such judgment, if in a court not of record, shall first have been docketed in the same place and manner as by law now required to make judgments in such courts liens upon real estate. And whenever any lien upon any premises shall have become fixed as aforesaid, the said board may cause the said premises to be sold at public auction, for a term of time, for the payment and satisfaction of such lien, and the expenses of such sale, giving notice of such sale for twelve weeks successively, once in each week, in one or more newspapers, published in the city, incorporated village or town where the premises are situated, as the case may be; or if no newspaper be published in such village or town, then in the newspaper published nearest said premises, and also serving a copy of such notice of sale personally on the owner or agent of said premises, if known, and a resident of said city, village or town, at least fourteen days previous to such sale, or by depositing the same in the post-office, directed to such owner or agent at his place of residence, if known, or the nearest post-office thereto, at least twenty-eight days previous to such sale. And the said premises shall be sold to the person who shall offer to take the same for the shortest time, paying the amount remaining unpaid upon such judgment, with interest, and the expenses of such notice and sale. A certificate of such sale, signed by the president and countersigned by the secretary of such board shall thereupon be made and delivered to the purchaser, and may be recorded in like manner and with like effect as deeds of conveyance of lands, and thereupon the purchaser, his heirs or assigns, shall be entitled to the possession of said premises so sold as aforesaid, and if unoccupied may immediately enter, and if occupied may have remedy against any occupant by action or by summary proceedings, as against a tenant holding over after expiration of his term; and in case the costs of such action or proceeding shall not be collected by such purchaser of the defendant therein, the same shall be a lien upon said premises, having the like preference as the lien aforesaid, and the term of the said purchaser shall be extended during a time bearing the same proportion to the original term as the amount of such cost bears to the amount paid by such purchaser on such sale. And such term shall commence when such purchaser shall have acquired possession. At any time after such sale, and within six months after the recording of such certificate as aforesaid, the owner or any lienor or incumbrancer of such premises, or of any part thereof, may redeem by paying to the purchaser the amount paid by him on such sale, and all costs and expenses he may have incurred in any action or proceeding as aforesaid to obtain possession, with ten per cent interest thereon. If such redemption be made by the owner, the right of the purchaser shall be extinguished; and if such lienor or incumbrancer, the amount paid by him to redeem shall be added to his lien or incumbrance, or if he have more than one, to the oldest, and shall thenceforth partake of the nature thereof and be collectible by any remedy adapted thereto.

Power to enter upon premises and suppress nuisance.

Unsatisfied judgment to be a lien upon the premises.

Sale of premises at auction.

Certificate of sale.

* As amended by chapter 790, Laws of 1867. Only when the regulation has been made and published can conviction be had for its violation. Reed v. People, 1 Park, Cr. R. p. 481.

§ 5.* All expenses incurred by the several boards of health **under their official orders or regulations, or under requirements of the statutes,** in the execution and performance of the duties imposed by this act shall be a charge only on their respective cities, villages and towns; and shall be audited levied, collected and paid in the same manner as other city, village and town charges are audited, levied, collected and paid.

Expenses of Boards of Health to be a town, village or city charge; how audited and paid.

§ 6. Whenever any **pestilential,** or infectious or contagious disease shall exist in any county poor-house in this State, or in the vicinity of any such county poor-house, and the physician of such county poor-house shall certify that such pestilence or disease is likely to endanger the health of the persons supported at such poor-house, the superintendent of such county poor-house shall have power to cause the person supported at such poor-house, or any of them, to be removed to such other suitable place in the same county as shall be designated by the board of health of the city, town or village within which such poor-house shall be, there to be maintained and provided for at the expense of the county, with all necessary medical care and attendance, until they shall be safely returned to the county poor-house from which they were taken, or otherwise discharged.

Persons sick of infectious disease may be removed from county poor-house.

§ 7. *In any instance in which there is a legally organized board of health in an incorporated village, which comprises parts of several towns, or less than a whole town, such board of health shall have full authority in regard to all matters relating to public health within said village, and such village which has its own organized board of health shall not be subject to the sanitary regulations or health officers of the township or towns within which such village is located; nor shall the taxable property of any such village, while maintaining its own board of health be subject to taxation for maintaining any town board or boards of health, or for any expenditures authorized by such town boards; but such expenditures of the town boards of health shall be assessed and collected exclusively on property in the town outside of said village.*

Village Boards and Villages not to be taxed to support town sanitary improvements, nor towns to support Village Boards of Health and their works.

§ 8. All acts and parts of acts inconsistent with this act are hereby repealed.

Other Statutes relating to Public Health.

Protection against Small-Pox.—Vaccination of School Children.—Chapter **438** of the Laws of 1860, is an *obligatory* law providing for the vaccination of all attendants at the public schools. An abstract and explanation of it are given in No. **41** of the printed Papers of this Board.

Prevention of Adulteration of Food and Drugs.—Chapter **407** of 1881, forbids adulteration of Foods and Drugs. The State Board of Health is required to conduct analytical investigations, and give practical effect to this statute.

Safety-Testing and fixed Standards to prevent dangerous use of Explosive Illuminating Oils.—By Chapter **292** of the Laws of 1882 the use of Petroleum products which give off an explosive vapor at a temperature below 100° Fahr., as tested by methods and instruments approved and directed by the State Board of Health, is prohibited. The State Board is charged with the administration of this statute.

Adulteration and Deception in regard to Milk as sold to Customers.—By Chapters **544** of 1864, **220** of 1878, and **407** of 1881, every kind and mode of adulteration and deception in Milk is prohibited. Local boards of heath, as well as persons aggrieved or cognizant, may bring action in court to secure infliction of penalties.

To provide for Public Drainage of Swamps and Wet Lands for Protection of the Public Health.—Chapters **888** of 1869, **303** of 1871, and **243** of 1873, provide ways and means for securing public drainage wherever public health and a Commission judicially appointed demand such general drainage works.

The organic Act creating the State Board of Health and defining the powers of the Governor and the Board.— Chapters **322** of 1880 and **308** of 1882.

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*As amended by chapter 761, Laws of 1868, and chapter 351 of 1882.

[No. 10, Revised.]

STATE BOARD OF HEALTH OF NEW YORK.

Ready references to the Health Laws published by direction of the State Board of Health of New York.

The purposes and duties of this Board, as defined in chapter **322**, Laws of 1880, relate wholly to the interests of life and health among the people.

Co-operation between local and State officers, and the exchange of information and reports for the promotion of sanitary welfare, are provided for by sections 6, 7, 8 and 9 of the said law. The State Board does not supersede, but incites prompt and systematic operation of, the local authorities. The State system of Registration of Vital Statistics is supervised and made uniform by the State Board, but every town and school district has its full responsibility in the Local Registry.

Supervisors of the respective Counties are responsible for expenses and local regulations pertaining to the Registry of Vital Statistics. (Chapt. **152** of 1847, and **522** of 1880.) The State Board of Health is required to *prepare* the forms and methods, to obtain and preserve such records and to insure their faithful registration. (Sect. 7, chapt. **322** of 1880; *Local Boards of Health are now in full authority* and must supervise and provide; sect. 3, chapt. **431** of 1881; subdiv. 5, sect. 3, chapt. **351** of 1882.)

Town Clerks are local recorders or Registrars, and Clerks of school districts are the assistants both of the local recorders and the State Board. (Chapt. **512** of 1880, and chapt. **152** of 1847.) The registration of each certificate being made immediately after the event which the law requires recorded, all further clerical work is saved by forwarding the recorded papers to the State Board, monthly. The Board, by its committee and the Superintendent of Registration, has supplied, and will continue to supply, the information and directions necessary to this service.

Reports and records of prevalent diseases are required by law (chapt. **322**, sects. 6 and 7) from Local Boards and officers of Health, to the State Board. This duty implies a supervision of records of mortality as now ordered in subdiv. 5, sect. 3, chapt. **351** of 1882. Such supervision will aid in securing the correct registry of deaths.

The formal Permit for Burial is required, and the laws (chapt. **512** of 1880, and subdiv. 5, sect. 3, chapt. **351** of 1882) provide that a Certificate of Death and its causes shall be offered and shall be everywhere possible before the Burial Permit is given. The Transit Permit is designed to secure the transit through different counties or States by public carriers without interruption or cost to public carriers.

Local Boards of Health are organized in accordance with chapters **431** of 1881, and **351** of 1882, or under statutes relating to villages and cities. Town Boards of Health consist of supervisor and justices, without legislative powers, but with the duty to make and enforce sanitary regulations under existing laws, and to appoint a competent medical officer. City and village Health Boards have more varied powers. The State Board co-operates with and can aid all, and this Board urges that the local Boards be maintained in a fully organized condition, even in healthful towns and villages. The Town Clerk and an elected citizen are added to Town Board by chapter **431** of 1881. (See chapters **322** of 1880, **431** of 1881, and **351** of 1882.)

Epidemic and Preventable Diseases occur in all parts of the State, and are to be promptly reported to and investigated by the State Board. Health officers of towns and villages, and the local Boards of Health are chiefly responsible for such reports and information; while the State Board gives information, counsel and skilled investigation for the benefit of all. The local and central authorities are thus co-ordinated. (*See sections* 6, 7, 8, 9 *and* 10; *chapter* **322** of 1880, *and section* 3; *chapter* **351** of 1882.)

Specific laws to promote sanitary welfare.— The statutes concerning vaccination as the safeguard against small-pox; nuisances and matters detrimental to public health; the encouragement of public supplies of pure water; the drainage of swamps and other wet lands; the protection of pure milk-supplies, together with other matters relating directly to the protection of health and life are printed in Papers which this Board furnishes to

local Boards. Other and better laws may be devised. The State Board will counsel with and assist local sanitary authorities and the proper committees to procure needed improvements in the laws and their administration, agreeably to *sections* 7, 8 and 11, *chapter* **322** *of* 1880; *chapter* **407** *of* 1881, *and chapters* **292, 308** *and* **351** *of* 1882. Under chapters 291 and 490, Laws of 1883, various new duties have been added.

Sanitary investigations by the State Board are ever in progress as a branch of its duty to the people, and as the law provides that they and their local authorities, the Governor of the State, as well as this Board itself may require such investigations to be made in the interests of health and life (*sections* 6, 7, 8, 9 *and* 10), authority has been conferred to invite local co-operation and employ skilled assistance. Health officers, physicians, the clerks and professional persons concerned in registration, and enlightened citizens throughout the State are requested to co-operate with and seek the co-operation of this Board. A copy of every sanitary report, regulation, rule and ordinance published in this State is requested. The favor will be reciprocated. The offices of the Board are in rooms 11 and 12 at the Capitol at Albany, and the Board's investigations of alleged nuisances are open to the attendance and deliberations of representatives of health authorities of all cities in the State (sec. **9**, chap. **322** of 1880), to promote sanitary knowledge and improvements.

MODES AND EXAMPLES ON SANITARY PROCEDURE, ETC.

At the annual meeting in May, 1881, and subsequently, the Secretary was directed to prepare a circular of information upon the best methods of procedure by local sanitary authorities, under the amended laws, against nuisances and other sources of damages to public health. The Board having directed that suitable and most economical plans for contagious disease refuges should be prepared as an appendix to such circular, and that the whole be issued to all local Boards of Health and also be printed in the Second Annual Report, that document is here presented

E. H., *Secretary.*

[No. 27.]

STATE BOARD OF HEALTH OF NEW YORK.

DUTIES AND PROCEDURES OF LOCAL BOARDS OF HEALTH AND THEIR OFFICERS.—EXAMPLES, METHODS AND SUGGESTIONS.

The laws require the Health Boards to "have cognizance of the causes of injury or danger to the public health." Full power is given every Board to make and enforce regulations and orders of *general obligation*, which shall be published and obeyed as laws; also to make *special orders*, without publication, to be immediately enforced for the suppression of nuisances and of sources of contagious diseases or other great dangers to life and health. In this circular the State Board of Health presents a practical view of sanitary procedures, as they relate to nuisances, the protection of health in schools, the removal of causes of malaria, and the control of contagious diseases. In this service, every local Board of Health is required

To be organized according to the statutes.

To have "a competent physician as Health Officer."

To adopt and publish regulations and orders of general obligation.

To prescribe "the duties and powers of the local Health Officer."

To give information to all inhabitants concerning their duties in regard to the registry of deaths, births and marriages, the burial of the dead, and the sanitary care of contagious diseases, and to designate the persons who shall grant permits for the burial of the dead.

To notify all physicians, clergymen and magistrates of their duty relating to certified records for registration.

To make and preserve accurate records of all official proceedings, and to require the Health Officer to do so in his service.

To cause every case of small-pox to be reported immediately to the local Health Officer, and to require him to report to the State Board of Health the fresh outbreaks of that contagion the day he verifies the cases; also to report to the State Board monthly.

All citizens should be free to enter complaints, and the Board should supply a form and a book for recording such complaints.

Procedures Against Nuisances.

Under the Board's instructions its Health Officer, or other qualified person, must inspect, examine evidence, and make his report to the Board, as the preliminary step to his formal complaint or an official order. Notification, official advice, and a summary or informal order may be usefully given without delay. The formal complaint and order must state that the offense is in violation of a regulation or order of the Board, or that it is "dangerous to life and detrimental to health;" or, being on or near a route of public travel, is noisome or detrimental to public health." Such specific complaints and orders will chiefly relate to scavenging and removal of filth-nuisances, disinfecting, etc., draining, and removal and prevention of obstructions; also cleansing and filling, grading, ventilating, lighting or regulating tenements and places of assemblage, the prevention of noxious emanations, etc.; the isolation and control of dangerous contagions, and the necessary interference with any other causes of imminent peril to life and health.

Illustrative Cases in Practice.*

The Board of Health in the town of V——, at its stated meeting June 25, having already adopted and published the first *eleven* sanitary Regulations as advised by the State Board of Health [*Paper* No. 26], took action as follows:—

For the removal of marshy and malarial borders of a mill-pond, seven acres in extent, in the village of M——. Upon complaint of the Health Officer and on personal inspection by the Board,

"*Resolved*,—That the Secretary serve the following notice upon Messrs. B. and A, as part owners, and on Messrs. A. B. and E. B. as part owners and lessees:— That they are hereby ordered to remove and drain the marshy borders of the mill-pond hereby declared to be a nuisance,—situated on their respective lands and under their control, on or before the 20th day of July, 1881."

For the Abatement of an Old Slaughter-House Nuisance, and for the Cleansing and Disinfection of the Building.— Upon complaint of the Health Officer, and after inspection by the Board on the 19th of June,

"*Resolved*,— That the Secretary of this Board serve the following notice upon H. S——, the owner:—

"That she is hereby ordered to remove and burn all boards, timbers and other things which are saturated with animal matter in and about the building known and used as a slaughter-house on the western border of the mill-pond marsh, on C—— street, and that the building be thoroughly fumigated, cleansed and disinfected, on or before the 20th of July, 1881."

*The examples here given have occurred during the past twelve months. The forms of procedure are such as will be found most convenient and effectual in daily sanitary service.

To Remove a Cause of Pollution of a Running Stream used for Domestic Purposes.

"*Resolved*,—That the following notice be served by the Secretary on C—— S——: That he is hereby ordered forthwith to remove or burn the dead horse which he has buried near a running stream at ——."

Complaint by Citizens, and summary Orders from the Board of Health, served by Health Officer, under the published regulations. Report of service and compliance:

COMPLAINT —

"*To the Board of Health, village* (or town) *of* ——————:

"Take notice that there is, upon the premises owned by J—— K——, and occupied by Mrs. ——, at No. —, —— street, an overflowing privy-vault; and that I hereby complain of the same as a nuisance."

"Dated ——, N. Y., this 7th day of May, 1882." "C. H., *Complainant.*"

Upon this Complaint the Health Officer indorses, and returns to the Board —

CONCERNING NUISANCE AT ——

"*To the Board of Health of* ..... :

"I certify that on the 7th day of May, 1882, I received the within complaint, and that on the 7th of May I examined the premises and requested the owner to remove the contents of privy-vault. This he did *partially*; — the nuisance remaining. June 7th he was served with *notice to abate* within 3 days. June 10th it was found abated.

"(Signed) —— ——,
Health Officer."

"(Dated) ——.

COPY OF ORDER TO ABATE.

"*To Mr. J—— K——*:

"You are hereby required within 3 days to abate a nuisance upon your premises on ——, in —— village, viz., an overflowing privy-vault and a cesspool in front of said premises, or the same will be done, and the expense thereof collected from you, together with the penalty of neglect in relation thereto.

"By order of the Board of Health.

"—— ——,
Health Officer."

NOTE.—This order was served on owner and the tenants at the same time. It was fully complied with by J. K., the owner.

Summary Order for Abatement of Nuisance of Stagnant Water, and an old Cistern, by the Board of Health of the town of ——:

"*To* ——————————, owner and occupant of premises on the corner of I—— and W—— streets:

"You are hereby notified that the stagnant water upon your premises and bordering upon the public streets here mentioned, and an old cistern there situated, have been declared a nuisance by this Board, dangerous to life and detrimental to health. You are hereby required to abate said nuisance, within three days from the date hereof, by filling up said cistern, removing all rubbish and obstructions to drainage, and by keeping the said premises so drained, as to be free from all surface-water."

Local Sanitary Officers Obstructed.—Outbreak of Diphtheria in a Summer Resort of Families.—Notices by telegraph and mail were received by the State Board of Health announcing an outbreak of diphtheria, stating that the owner refused to comply with the sanitary requirements of the local Board of Health, and requesting inspection and advice by the State Board.

Inspection and Report by Commissioner and a Sanitary Engineer of the State Board of Health:—"Found four large buildings occupied by 300 inmates, mostly in families. It is a family resort and summer hotel. Six cases of diphtheria had occurred,—one suddenly fatal.

"*Drainage and Sewerage.*—Conducted from all directions in the basement under the largest building to a central receiving vault, which is an untrapped cesspool immediately under the center of said building. Numerous water-closets, urinals, ice-boxes, provision-chambers and pantries drain into this cesspool. The slop-sinks are untrapped; the basement floors and joists are rotten and the decayed flooring of many of the basement rooms has been torn up and laid in piles. Accumulated filth, cart-loads of rotten floorings and mud about the water-closets of the basement, endanger the inmates of the buildings. None of the closets, slop-sinks, etc., are stench-trapped. Stenches everywhere.

Ventilation.—The bath-rooms, water-closets, slop-closets and privies in each of the buildings have no ventilation excepting through the apartments in which situated. The basement and cellars are chiefly ventilated directly upward through the rarefied atmosphere of the several buildings and their corridors and promenades."

Action by the Local Board of Health.—Based upon the details of the inspection, minutely recorded, the village Board of Health immediately convened and unanimously issued its sanitary orders covering eleven specifications of work to be forthwith executed, by the owner of the property.

Remark.—In this instance the State Board provided the expert inspection upon which the orders were made and carried into execution. The first order was in the following terms: "To empty, cleanse and disinfect the great cesspool or receiving vault in the basement at the head of the main sewer and the pipes discharging into it; to remove all obstruction from the house sewers, and ventilate the receiving vault by a shaft six inches in diameter, which shall be carried above the highest point in the roof; to have flag-stones over said cesspool or vault laid air-tight in cement."

This instance illustrates the way in which a local Board of Health may appeal to the State Board. Local Boards, under the amended law, have the right to enter and examine, for sanitary purposes only, any place or premises. (See subdiv. 3 of § 3, chapter 351, 1882.)

Case of a Badly Ventilated School-house—its Cesspools returning their Gases into it.—The physicians in the town of C—— have for years quoted the enormous rate of sickness and mortality of the pupils in Public School No. 4, as evidence of unhygienic conditions that should be officially abated and prevented in and about said school-house. The local Board of Health inspected the premises, and early in December, 1881, with the aid and specifications of a sanitary engineer, instructed the school officers to close several class-rooms forthwith, and make certain changes and repairs specified in the engineer's report. Those specifications were, * * * that,—

(a.) No provision whatever exists for ventilation of the basement and first story of the building; and, with only a single exception, the same is true of second story.

(b.) The heating apparatus derives its air supply from the basement room that is occupied as a janitor's dormitory.

(c.) The three water-closets in the basement discharge into a horizontal pipe that passes under the cellar floor, onward to the cesspools in the yard. There are hopper-closets in the yard, all unventilated and in foul condition. * * *

It is required that changes and improvements be made as follows:

(1.) *Ventilation — first story* —A board six inches wide, to be fitted close to lower sash of windows, so that sash may be raised sufficiently to admit a copious supply of fresh air between top panes of the lower and the bottom panes of upper sash, without draft across the heads of pupils. Let the windows of second story be treated in like manner; also from ceiling of centre of each room of this story conduct a galvanized iron cylinder or air-shaft, for exit of foul air, through and to a height of two feet or more above the roof. Place regulating registers at lower end of these air-shafts, flush with ceiling. Cover tops above roof with cowls.

(2.) Basement and its quarters for janitor to be vacated, and kept ventilated through-and-through.

(3.) The air-supply channels to take pure air from above, and none from basement.

(4.) Remove water-closets, and substitute suitable ones with adequate means of flushing and constant cleansing [specifications submitted]. Every closet in the house to be ventilated by shaft from trap, separately, to above the roof [specifications given]. The filthy hopper-closets in the yard to be superseded by suitable substitutes [specified].

Action by Board of Health and School Trustees — The Trustees suspended the school in those class-rooms which the Board of Health condemned, and made the improvements as specified. On the 2d of February the Board reported that the work was well executed, and the class-rooms all fit to be re-occupied. After four months the teachers and sanitary officers report that, though overcrowded, no sickness or deaths have occurred. Trustees report that further improvements will be made during summer vacation.

PROCEDURES BEFORE THE COURTS.

The public Health act, chapter 351 of 1882, provides for three classes of cases, and suitable methods of procedure, before any court of competent jurisdiction.*

First. Under subdivision 7, section 3 of the act, the Board may issue warrants to any constable or sheriff, which shall have the force as if issued out of a court of record, and which shall forthwith be executed by said officers, for the purpose of instantly controlling causes of great

*The courts of competent jurisdiction for merely enforcing the Board's orders without waiting indictment and conviction for misdemeanor are: (1) The Board itself, for determining the facts concerning failures or refusal to obey sanitary regulations or orders, when a fine not exceeding $100 may be imposed by the Board; (2) a police justice or any justice of the peace; and, (3), any court of criminal jurisdiction for violation of laws against harm to life and health. Boards of Health may ascertain what is most expedient in law procedures by consulting the District Attorney or other competent counselor-at-law. Concerning these points the Attorney-General has stated that the remedies for violations of the health laws, and of the orders and regulations of local Boards of Health, are threefold:

danger to public health, and to apprehend and remove persons who cannot otherwise be subjected to the sanitary orders and regulations.

Second. To impose penalties directly for violations of, or non-compliance with, sanitary orders and regulations, and to maintain actions in any court of competent jurisdiction, and collect such penalties, not exceeding one hundred dollars in any one case. Also to sue for and collect the costs that have been incurred by the Board or a contractor under the Board in the execution of its order, whatever the sum may be.

Third. To bring offenders before the courts upon charges of misdemeanor, for violation of, or non-compliance with, sanitary regulations and orders, to be prosecuted and punished as provided by section 4 of the general Health act.

In all these procedures by a Board of Health, the law has fixed the nature of the offense in such manner that conviction thereof *may* be had without a formal indictment; yet in all cases of accusation of misdemeanor (as under section 4) the accused person has the right to a trial by jury, if he so elects; otherwise, *conviction* and *penalties* may be determined by any court of competent jurisdiction as respects the particular case or class of cases. All costs incurred by the Board in necessary execution of sanitary orders may be collected as provided in sections 3 and 4 of the Health act.

Sanitary Control of Infectious and Contagious Diseases; their Isolation or Quarantine.

Diseases propagated by contagion, also those caused by local conditions which should be controlled, removed and prevented, produce a large proportion of the sickness and mortality in the State.

Small-pox, diphtheria, scarlatina, typhoid fever and many other diseases are spread from house to house, and from place to place by infection. Dysentery and the diarrhœal diseases generally, malarial fevers and some other maladies are produced by local causes, which require definite action for their removal and prevention. The drainage, cleansing, drying, ventilation, etc., which are necessary to prevent disease, require sanitary inspection and suitable sanitary work.

The diseases which spread by personal infection, have to be controlled and "stamped out," by definite restraint upon the intercourse and exposure of individuals, by **separation or quarantine** of the sick

(1) Criminal proceeding. Willful violation or refusal to obey any order or regulation duly made, is, by section 4 (ch. 351, Laws 1882), and by section 397 Penal Code, made a misdemeanor, punishable by fine or imprisonment or both. Generally speaking, courts of Oyer and Terminer, and courts of sessions in counties have cognizance of these offenses; so also have certain local criminal courts in cities. The method of procedure in both the courts of Oyer and Terminer, and in the courts of sessions is by indictment.

(2) Civil proceedings for the recovery of the expenses incurred by the Board in summarily abating nuisances under section 4, chap. 351 of Laws 1882.

(3) Civil proceeding for the collection of penalties imposed under the authority of subdivision 9 of section 3.

The two latter proceedings are cognizable by civil courts having jurisdiction of the persons who are parties, and power to render judgment for the amounts demanded. Justices of the peace can give judgment to the amount of $200. County courts and the supreme court, likewise have jurisdiction, but recovery must be had to the amount of $50 to carry costs, recovery of a less amount subjecting the plaintiffs to the payment of the defendant's costs.

All of these remedies are concurrent, and can be resorted to in succession where either one proves ineffectual.

In addition to these remedies under the statutes for the enforcement of Health laws and regulations, there are also the old remedies, civil and criminal, for the abatement of nuisances, at the common law.

and of all infected things and places, and by thorough cleansing and disinfection of whatever is infected or has been exposed to contagion. Whatever is necessary in such procedures may be best illustrated by examples in practice, as here shown.

CASES AND SANITARY PROCEDURES IN PRACTICE:

Every case of small-pox, diphtheria, scarlatina, typhus or typhoid fever or other infectious malady, being,— by sanitary regulations,— in every town, city and village, *reported to the local Board of Health as soon as known*, the action taken by the physician, the family and the health officer should be,—

(1.) To separate the patient or patients, from all persons liable to take the disease.

(2.) To provide such perfect sanitary care for the sick and such prompt and complete disinfection for the apartments, clothing and other things that require disinfection, that disease shall not spread from them.

Duty of physician, householder and family.—Small-pox, diphtheria, scarlatina, typhus or typhoid fever being discovered and certified to exist in any house, the physician in attendance and the householder, or family where the disease appears, is required to give notice to the health officer, or if there is no health officer, then to the nearest member of the Board of Health, stating the name, age and circumstances of the sick person or persons. The medical attendant should at once separate the sick from all others than those who have the care of the cases, and should also carefully instruct the family concerning duties to themselves and to the sick.

Duty of Health Officer and Board of Health.— Be prepared to give specific directions, both verbally and by the printed card, showing precisely what to do, what to avoid, especially in regard to the apartments and persons where the sick are, the care and disinfection of all things that can communicate the disease, and also in regard to the rules concerning improper intercourse with and movements of the sick and whatever can convey the disease; also sanitary purification required at the termination of the case. The official card for this purpose should be placed in the hands of those in charge. The medical attendant is responsible for the duty of faithfully enforcing such rules and regulations as long as the sick and the family are under his professional care.

The sanitary authorities should direct the methods and extent of disinfection, but it is usually best to do this by the help of medical attendants, in no case, however, permitting these duties to be omitted. The official notice to the households and their medical attendants should state these rules and duties plainly and briefly. The following is a suitable form for such notice to the family or their physician or otherwise:

A——B—— being sick with [small-pox] must be kept entirely separate from all persons except the appointed attendants, and no others can be allowed to remain upon the same floor of the house, unless they have had small-pox, or been successfully vaccinated within a few years. The directions given in Nos. 15, 16 and 41 of the State Board of Health papers should be faithfully followed.

The attendants, as well as the sick themselves, should be kept entirely away from all persons who are not already protected against the contagion. The attending physician, and the undersigned, will give any information desired in each case, and the official release from sanitary restrictions will be given in writing as soon as it safely can be.

By order of the Board of Health,
(Signed) ————————
Health Officer of ————

Quarantine and other Sanitary Orders against Contagious Disease.—Though it is presumed that the health officer and the Board of Health will, with rare exceptions, have the confidence and concurrence of the people, so that sanitary orders and instructions will be promptly complied with, the law provides suitable means for enforcing any necessary order of the local Board of Health.

An order for the isolation or quarantine of any source of dangerous contagion is absolute in its nature, and must be promptly obeyed; and under sections **three** and **four** of the Public Health Act, as amended in 1867, 1881 and 1882, it is provided that "*Every person who shall willfully violate or refuse to obey any order or regulation, . . . so made and served shall be deemed guilty of a misdemeanor,*" and by issuing its warrants to the constable, the Board may "*apprehend and remove such persons as cannot otherwise be subjected to the orders and regulations by them adopted.*" In the execution of such orders the officers are required "*forthwith to execute them, as if the same had been duly issued out of any court of record.*"

Small-pox, diphtheria, typhus, typhoid and scarlet fevers and cholera may occur under circumstances that require such prompt action. The State Board has issued special sanitary papers, **Nos. 13, 14, 15, 16, 38** and **41,** to aid health officers and families in their duty concerning these diseases.

Records of deaths and prevalent diseases.—The laws require these records to be returned to each local Board, as well as to the State Board of Health, by the health officer. Card **No. 30** has been prepared for this purpose, and is supplied by the State Board. Cards **31** and **52** are for use by the medical attendants upon small-pox and diphtheria, and are supplied by this Board to physicians through the local Board.

Temporary Quarantine,—Refuge and Hospital.—There are four ways of quickly providing a suitable refuge and hospital for contagious disease.

(1.) At home, upon the upper floor, or in any completely secluded part of the house—cleared of all occupants, except the sick and attendants.
(2.) A separate little building suitable for a Hospital Ward ready for use.
(3.) A Board Hut or a Pavilion, hastily constructed for the purpose; or
(4.) a Hospital Tent and Fly canopy. These are the safest kinds of Contagious Disease Refuge during the warm season.

The *first* is the common expedient. It is best that the entire floor, or that a separate quarter or end of the dwelling be set apart for the domestic quarantine of the sick.

The *second* is occasionally the most available and suitable method. Such a separate building should be in a healthful spot, and thoroughly ventilated.

The *third* is frequently the best method of quickly and effectually providing for any increasing number of patients. The annexed plan and specifications for a Contagious Disease Refuge and Hut, is designed to show what may be constructed in a single day to meet an emergency, such as frequently occurs in villages, alms-houses and asylums. The Hospital Tent is the best kind of refuge in the warm season, if the tent-canvas and materials are at hand. The annexed plans and directions for the Tent-Hospital will be readily understood.

These methods need no further explanation in this circular; yet as regards any method of isolation, removal, and the quarantining of contagious diseases, *we must be careful to do the sick no harm* while the people are being incited to the duty of removing and preventing the causes of disease.

The objects of this circular will be attained if health officers and Boards of Health find their duties made clear and their work facilitated by it.*

Prepared and submitted by order of the State Board of Health.

ELISHA HARRIS, *Secretary.*

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* See the plans here proposed, on pages 265–268, in Chapter on Repressing Contagious Diseases.

[No. 53.]

PLAN OF ORGANIZATION OF A LOCAL BOARD OF HEALTH OF THE TOWN OF .....

As Adopted.....188 .

The following citizens constitute the present Town Board of Health:

NAME.		RESIDENCE.
.....	Supervisor,	.....
.....	Town Clerk,	.....
.....	Justice of Peace,	.....
.....	Justice of Peace,	.....
.....	Justice of Peace,	.....
.....	Justice of Peace,	.....
.....	Justice of Peace,	.....
.....	Citizen (appointed),	.....
Dr.....	Health Officer,	.....

The Health Officer, together with the following named Gentlemen, are authorized to grant Burial Permits, in accordance with the laws.

....

....

....

A Transit Burial Permit (for any burial beyond County limits) may be given by the Health Officer, and

....

....

The Board has ordered the following regulations to be printed and distributed for the information of every family in town. *Please preserve for future reference.*

By chapter 431 of the Session Laws of the State of New York, as enacted in 1881 and amended in 1882 (chapter 351), the Supervisor and Justices of the Peace and the Town Clerk, or a majority of them of each town in this State, together with a citizen of such town of full age to be elected by them, shall be the Board of Health for such town

for each year, and they shall appoint some competent physician, not a member of said Board, to be the Health Officer for such town.

They shall have cognizance of the causes of injury or danger to the public health, and shall meet upon call of the Supervisor. The duties of the local Board of Health may be enumerated as follows:

(*a.*) To receive and examine into the nature of complaints concerning causes of danger and injury to the public health.

(*b*) To report to the State Board of Health facts concerning infectious and epidemic diseases.

(*c.*) To take charge of, and provide for, the quarantine of cases of contagion and its sources.

(*d.*) To provide for the care of destitute and dangerously infectious persons.

(*e.*) To report every case of small-pox, and to provide the means for thorough and safe vaccination of those who may need it.

(*f.*) To supervise the registration of deaths, diseases and causes of death; to examine all certificates and records of death, and returns of coroners.

(*g.*) To designate persons who shall grant permits for burial.

(*h.*) To supervise and make complete the registration of deaths, births and marriages.

(*i.*) To publish necessary regulations and orders of "general obligation."

(*j.*) To make and enforce any "special order" without such publication, to meet an emergency not provided for by regulations of "general obligation."

(*k.*) To compel compliance with, and, if need be, to execute their orders; and in such procedures to issue warrants to constables, and, if necessary, to the sheriff, to bring to the Board's aid the power of the county. Such warrants to have the same force as if issued out of any court of record.

(*l.*) To employ any necessary aid to enforce the execution of the orders and regulations published and made; to impose penalties for non-compliance therewith, and to obtain judgment and fix liens for the payment of work executed by the Board.

The following regulations will be enforced by the local Board, namely:

Deaths and Burials. — The householder where death occurs, and whoever shall undertake to bury the dead, shall present to the Health Officer (or to the nearest member) of the Board of Health, a certificate of the death, as the law provides, and shall, as soon as practicable, receive from such officer the required permit, so that there may be no needless delay in the burial. A certificate of the death should be filed, and a burial permit be issued, at least twelve hours before the appointed hour for burial. The Health Officer and any Justice of the Peace are each authorized to issue burial permits, and to furnish blanks for certificates.

Birth-Records. — The physician, or whoever attends professionally at a birth, is required to make out the certificate and forward it to the registering officer; if there is no attendant, then one of the parents, or the head of the house where the birth occurs, shall make

out and attest the certificate, and forward it to the registering officer within three days after the birth. The "given" or "fore"-name should be certified as soon as given. The Town Clerk and Health Officer will supply cards and instructions for making such returns.

MARRIAGE-RECORD. — The person who legally attests the marriage ceremonial must certify his official act in the prescribed form, after which it is his duty to make sure that the record and certificate are placed in the hands of the registering officer within three days after the marriage.

☞ The registration of births, deaths and marriages, the examination of certificates and the granting of burial permits shall be without charge to the families to whom they relate.

Rules to be observed in the public registration of Deaths, Births and Marriages, and in the regulation of Burials. [From the published instructions of the State Board of Health.]

THE CERTIFICATE OF DEATH. — Immediately after a death it is required that the householder, or some other person present and best acquainted with the record of the deceased, shall fill out, or cause to be written, all that is needed to be inserted in the blank spaces of the first ten lines of the death certificate. The certificate, so written, must be presented to the medical attendant, or in case there has been no medical attendant, must be taken directly to the nearest officer of the Board of Health, or to a Justice of the Peace, who will cause the proper medical certificate of the cause of death to be completed in the blank spaces on and under the eleventh line of the certificate. This duty should be attended to within twenty-four hours after death, and the certificate, thus completed, must be presented to one of the permit officers of the Board of Health, or to the Town Clerk, for the burial permit. Such certificate of death should be presented, and the burial permit issued, at least twelve hours before the appointed time for the funeral or removal of the corpse.

THE BURIAL PERMIT. — This permit must go with the corpse to the place of burial. It is to be retained by the keeper of the cemetery until called for by the Board of Health.

THE TRANSIT BURIAL PERMIT. — When the corpse is to be removed beyond the county in which the death occurs, the transit permit, which has two coupons, perforated for removal as required, will be used in accordance with the rules printed on the permit. This will secure the uninterrupted and unquestioned right of transportation of such corpse to the place of burial, wherever that may be.

A rule to be observed in the burial of those who die of Acute Contagious Diseases. — No public funeral, no opening of the coffin, and no transportation (unless in a sealed metallic or lead-lined coffin) by public carriers beyond the nearest appropriate burial place, should be permitted in the case of those who die of diphtheria, scarlet fever, measles or typhus. The corpse should be wrapped in strong disinfectants until buried.

THE DEAD BORN:—*Still-births.* — An infant born dead must be cer-

tified as a still-birth, and will be buried as any other corpse, and must have a burial permit. The certificate of a *still-birth* will be kept in the local registering office, but will not be recorded with other deaths, nor with births. You will report monthly, in your regular returns to the State Board, the number of still-births.

MARRIAGE-RECORDS should, in all cases, be written out by the bride and groom and be ready for the attesting signatures of witnesses and the person who solemnizes the ceremonial. Though the statutes require the clergyman, or other person who professionally certifies the facts and ceremonial, to cause such record and certificate to be delivered to the registering officer, the Laws of 1880 and 1882 require the State sanitary authorities to prepare the forms and methods for making the records and registry of marriage, birth and death complete throughout the State. The couple who enter upon matrimony must furnish their required personal records and be prepared to offer the proper witnesses and signatures at the time of the ceremonial.

Orders and regulations (of general obligation) adopted by the Board of Health for the town of..... , county of....., State of New York.

First. Whatever is dangerous to human life, and whatever renders the air, or food and water, or drink unwholesome, are declared to be nuisances, and to be unlawful.

§ 2. No privy-vault, cess-pool or reservoir into which a privy, water-closet, stable or sink is drained, except it be water-tight, shall be established or permitted within fifty feet of any well, spring or other source of water used for drinking or culinary purposes. And every privy-vault and cess-pool shall be cleaned, and the contents thereof removed, at least once before the first of May in each year.

§ 3. No house offal, dead animals or refuse of any kind shall be thrown upon the street or left exposed by any person ; and all putrid and decaying animal or vegetable matter must be removed from all cellars and out-buildings at least once in each year and on or before May first in each year.

§ 4. No meat, fish, birds, fowls, fruit, vegetables, milk, and nothing for human food, not being then healthy, fresh, sound, wholesome, fit and safe for such use, nor any animal or fish that died by disease or accident, and no carcass of any calf, pig or lamb, which, at the time of its death, was less than four weeks' old, and no meat therefrom shall be brought within the limits of this town, or offered or held for sale as food anywhere in said town.

§ 5. Any householder in whose dwelling there shall occur a case of scarlet fever, diphtheria or small-pox shall immediately notify the Board of Health of the same; and until instructions are received from the said Board, shall not permit any clothing or other property that may have been exposed to infection to be removed from the house. Nor shall any occupant change his residence elsewhere without the consent of the said Board during the prevalence of any public danger from said disease; and all physicians and other attendants upon any person sick with small-pox, typhoid or scarlet fever, diphtheria or other disease dangerous to the public health shall forthwith report the

same to the Board of Health. And it shall be the duty of such physicians and attendants to avoid exposure to the public of any garments or clothing about their own persons that may have been infected from exposure to any diseases. Nor shall any of the excretions of the body from a person infected with typhoid be thrown in a privy vault, but the same shall be buried in the ground at least one hundred feet from any dwelling or well.

§ 6. There shall not be a public or church funeral of any person who has died of small-pox, diphtheria, scarlet fever, and the family of the deceased is required to limit the attendance to as few as possible, and to prevent the presence, so far as they are able, of those who have not had the disease of which the deceased person died; and it shall be the duty of householders and all persons concerned, where a death occurs from any contagious or pestilential disease, to prevent needless assembling in the apartments and house, where such diseases are, of all persons liable to become infected thereby.

Any local Board of Health can enforce compliance, and inflict a penalty not exceeding a hundred dollars ($100) for non-compliance with, or the violation of its lawful regulations and orders.

These regulations shall go into effect immediately.

.....*President.*

.....*Secretary.*

.....*Health Officer.*

Dated at.....

.....188 .

[No. 54.]

STATE BOARD OF HEALTH OF NEW YORK.

To the Health Officer of.....

This Board respectfully urges that the duty required under section **3** of the amended Act for the Preservation of Public Health shall be strictly complied with in all respects.

As the Health Officer is usually the executive as well as medical officer of the Board, his duties and powers should be prescribed (under subdivision **2**, section **3** of the amended act) by the local Board. He should especially be instructed and authorized by the Board to perform the various duties defined under subdivisions **3, 4** and **5**, so far as a medical officer can best perform them; and he should have special supervision of, and give constant advice relating to, the Certificates of Death and the Permits for Burial.

The local Board of Health, by its Health Officer, should communicate to the State Board of Health whatever information it can concerning the occurrence of the **acute Contagious Diseases.** Whenever a case of **Small-pox** occurs, the Health Officer should at once require and obtain a correct report of the same, and instantly give the necessary instruction and official orders. He should report the case, and also the place where it occurs, to the State Board of Health, by telegraph or the first mail (see subdivision **5**, section **3** of the Health Act, and page **4** of circular **38**). Diphtheria and Scarlet Fever should be reported under local orders of your Board, directly to you, by the householders, as well as physicians who have charge of the patients. The State Board wishes your reports upon such occurrences when you have investigated them, also whenever this Board can give you any aid and counsel. Circulars Nos. **13, 14, 15** and **16**, with the record-cards **31** and **32**, are supplied freely to Health Officers and other physicians.

THE MONTHLY RETURNS OF RECORDS of mortality and the prevalent diseases are required by the State Board of Health upon the form [No. **30**] now furnished to you. This Board will supply any number of the same cards, and any other blanks for use of physicians who practice within the limits of your Board's jurisdiction, so that they may make a return to you every month. A one cent stamp attached to the card when filled out, passes it through the mail. The general

duties and procedures of a local Board and its Health Officer are defined and illustrated in document No. **27**, now sent to you.

The various laws under which public health duties and works are provided for, in this State, you will find printed in the Second Annual Report, pages 417–425, 492, 497–499.

Reports from Local Health Officers and Boards.— In addition to the immediate report of **Small-pox**, and the Health Officer's monthly report of mortality and prevalent diseases, it is desired that Diphtheria, whenever it begins to spread, shall have its first cases reported in accordance with the form [No. **32**]. Also, that physicians shall report to you all their cases in similar form. You will please cause a quarterly and a yearly report to be made to the State Board of Health upon the printed forms which will be sent to you; also send to this Board a copy of all regulations and orders of general obligation adopted by your Board, together with printed instructions which you officially issue. The State Board makes such exchanges with all local Boards, as required by law. (See pages 418, 419 land 423 of Second Annual Report.)

Statistical and other Systematic Reports.— The record-card [No. **30**] for monthly returns, and a tabulated quarto sheet, **55**, for a Quarterly Statement, now supplied by this Board, will enable you to make the returns desired by the undersigned, and required by the laws. The Registry Clerks make their returns monthly, as required by circulars **36** and **36**^{a}, **49** and **50**, here inclosed for your information. The facts given in these papers should be understood by all physicians, ministers and families. In No. **53** is presented an example of the effective organization, regulations and orders of general obligation by a Town Board of Health. Lawful procedures and methods of Health Authorities are described in No. **27**, to which is appended a memorandum on Contagious Disease Refuges and Temporary Hospitals.

Respectfully,

EDWARD M. MOORE,
President.

Elisha Harris, *Secretary.*

Office of the State Board of Health,
Albany, *January* 1, 1883.

[No. 36.]

OFFICE OF STATE BOARD OF HEALTH OF NEW YORK.

ALBANY, *May* 10, 1882.

To Boards of Health and Local Registering Officers:

RULES TO BE OBSERVED IN THE PUBLIC REGISTRATION OF DEATHS, BIRTHS, AND MARRIAGES, AND IN THE REGULATION OF BURIALS.

THE CERTIFICATE OF DEATH.— Immediately after a death it is required that the householder, or some other person present and best acquainted with the record of the deceased, shall fill out, or cause to be written, all that is needed to be inserted in the blank spaces of the first **10** lines of the death certificate. The certificate, so written, must be presented to the medical attendant, or, in case there has been no medical attendant, must be taken directly to the nearest officer of the Board of Health, or to a Justice of the Peace, who will cause the proper **medical certificate** of the cause of death to be completed in the blank spaces on and under the **11th** line of the certificate. This duty should be attended to **within 24 hours after death,** and the certificate, thus completed, must be presented to the Permit officer of the Board of Health, or to the Town Clerk, for the Burial Permit. Such certificate of death must be presented, and the Burial Permit issued, at least twelve hours before the appointed time for the funeral or removal of the corpse.

THE BURIAL PERMIT.—This Permit must go with the corpse to the place of burial. It is to be retained by the Keeper of the Cemetery until called for by the Board of Health.

The TRANSIT BURIAL PERMIT.— When the corpse is to be removed beyond the county in which the death occurs, the **Transit Permit,** which has two coupons, perforated for removal as required, will be used in accordance with the rules printed on the Permit. This will secure the uninterrupted and unquestioned right of transportation of such corpse to the place of burial, wherever that may be.

A rule to be observed in the Burial of those who die of Acute Contagious Diseases.— No public funeral, no opening of the coffin, and no transportation (unless in a sealed metallic or lead-lined coffin) by public carriers beyond the nearest appropriate burial place, should be permitted in the case of those who die of diphtheria, scarlet fever, measles or typhus. The corpse should be wrapped in strong disinfectants until buried.

THE DEAD BORN : — *Still-Births.*— An infant born dead must be certified as a still-birth, and will be buried as any other corpse, and must have a Burial Permit. The certificate of a *still-birth* will be kept in the local registering office, but will not be recorded with other

deaths, nor with births. You will report monthly, in your regular returns to the State Board, the number of Still-Births.

☞ **Careful attention to these duties relating to the immediate procuring of Certificates of Death and the issue, thereupon, of the Burial Permit, will prevent any delays and inconvenience in the removal and burial of the dead.**

Birth Certificates and the Birth Register.— The physician, or whoever attends professionally at a birth, is required to make out the certificate and forward it to the local registering officer. If there is no professional attendant, then one of the parents, or the head of the house where the birth occurs, should make out and attest the certificate, and forward it to the registering officer, as soon as practicable, or within three days, at the latest, after the birth. The "Given" or "Fore" name should be certified and registered as soon as given, and it can be sent, by the local registrar, to the State Board of Vital Statistics, at any time within six months. The Town Clerk and Health Officer will supply the card and instructions for making such return of the delayed name of the infant.

Marriage Records.— On the day of a marriage, and while the proper witnesses are present with the married couple, the record should be made out and signed by them according to the forms required by the State. *The person who legally solemnizes or attests the marriage ceremonial must certify his official act*, in the prescribed form, after which it is his duty to make sure that the record and certificate are placed in the hands of the local registering officer within three days after the marriage.

N. B.— The public registration must be made in the place (Town, Village or City) in which the event — to be recorded — occurs.

RECORDS OF PREVALENT DISEASES.

The laws require that every local Board of Health shall report to the State Board every case of small-pox and varioloid, and the facts relating to epidemic, infectious and prevalent diseases; and it is made the duty of each local Board to receive, and examine into, the complaints made by any inhabitant concerning causes of danger or injury to the public health. Each local Board has power to take whatever action is necessary to prevent the spread of dangerous diseases, and the laws require that the State Board of Health shall give any necessary information and advice in such duties.

REPORTS TO THE STATE BOARD OF HEALTH.

The State Board of Health is required to receive and give attention to reports from the local Boards of Health; and the laws also require that the local Boards shall make reports and give information whenever called upon by the State Board.

Regular monthly returns and reports of all records (certificates of Births, Deaths and Marriages) are required to be made to the State Bureau of Vital Statistics, at the office of the State Board of Health, at Albany, on the 15th of every month, to comprise all the certificates of Birth, Death and Marriage that have been received and registered in

or for the preceding calendar month. The State Bureau furnishes suitable blanks and envelopes for this purpose, and each local registrar will have returned to him the full amount of postage or expressage that he has paid. Envelopes, postage, and any publication which the State Board has for the use of local officers, will be sent, on application to the Secretary.

FEES AND OTHER COMPENSATION.

The Board of Supervisors may fix the compensation and may regulate the registration in any county where said Board takes action in accordance with chap. **512,** of 1880; but *the local Board of Health in every city, village and town in the State is charged with the duty of making the registration complete, and providing regulations for the burial of the dead, and designating officers who shall issue the Burial Permits;* and the cost of such service, under direction of the Boards of Health, shall not exceed fifty cents for each record. The average cost thus far is less than fifty cents. Every Board of Health is authorized by chap. **431,** of 1881, to assume the entire direction of registration and the regulation of burials, etc.; and where the county has not already enacted a local law to provide for the service by a general charge upon the county, this new law makes it a general charge upon the Town, Village or City whose Board takes these duties in hand.

☞ **The blank certificates should be distributed in stitched packets to every physician, clergyman, magistrate and midwife, according to their respective professional duties.** Using the State Board's stereotype plates, fresh supplies of them, stitched in packages to suit, can be obtained at the bare cost of printing and paper, at any time and in any quantity required.

Blanks on a durable kind of paper for TRANSCRIPTS of individual records from any one of the three Registers, are furnished to any persons who require them.

The INDEX BOOK, to accompany the Registers, are prepared by Messrs. C. Van Benthuysen & Sons, and will be forwarded at cost, to the Registering Officers on their application. The Registered records should be completely *Indexed* at the close of the year.

RECORD-CARDS, (22, 30, 31–32), for distribution and use by Health Officers, Physicians and Registrars, will be sent to them on application.

[No. 36.]c

STATE BOARD OF HEALTH OF NEW YORK.

CONCERNING REGISTRATION, VITAL STATISTICS AND CERTIFIED RECORDS.

The board of health in every town, village and city is held responsible, under the laws, for the complete and perfect registry of deaths, births and marriages, and for the records and lawful permits of burials.

The law limits the cost of each registered record to a sum not exceeding fifty cents. The payment of such registration fee is a charge which, when fixed by authority, can neither be diminished nor disputed. The same is true of the necessary cost of the three registers and the blank forms used for certificates and permits, as ordered by the local authorities.

The registry laws have created no new offices. The town clerk, village clerk, city clerk or a health officer or registering clerk whom the local board of health appoints, must keep and register these records as the laws and the local board of health require. (See subdiv. 5, sec. 3, chapt. 351, Laws of 1882.)

The State Board of Health, being informed from month to month concerning the records as registered in each place, is required by law to enforce the registration, and perfect it whenever any local board of health neglects it *after three months' notice* from the State Bureau of Registration and Vital Statistics at Albany. Such a notice will be served upon any board and registering officer whenever the State Board finds it necessary to do so; and after three months from such notice, if the records are not being completely and properly registered, the State Board is required to assume the direction of this duty in each such place, and to cause the laws relating to this matter to be strictly complied with.

Disregard of the duties, or violation of the laws and regulations, relating to the records, or the registry of them, is punishable by a heavy fine that the Board of Health can impose, or by penalties the courts will impose for willful misdemeanor.

Any local board of health can enforce compliance, and inflict a penalty not exceeding a hundred dollars ($100) for non-compliance with its published regulations under the statutes.

Each local board of health must adopt and publish all necessary regulations, and will do well to publish a regulation and order, in something like the following terms:

[*For specific instructions upon all questions of duty relating to certificates, records, and public registry of deaths, births, marriages, and burials, we refer to circular* **36** *of the State Board of Health.*] *The following regulations will be enforced by this local board, namely:*

DEATHS AND BURIALS.— *The householder where a death occurs, and whoever shall undertake to bury the dead, shall present to the health officer (or to the nearest member) of the board of health a certificate of the death, as the law provides, and shall, as soon as practicable, receive from such officer, the required permit, so that there may be no needless delay in the burial. A certificate of death should be filed, and a burial permit be issued, at least twelve hours before the appointed hour for burial. The health officer and the justices of the peace are each authorized to issue burial permits, and to furnish blanks for certificates.*

BIRTH-RECORDS.— *The physician, or whoever attends professionally at a birth, is required to make out the certificate and forward it to the registering officer; if there is no attendant, then one of the parents, or the head of the house where the birth occurs, shall make out and attest the certificate, and forward it to the registering officer within three days after the birth. The "given" or "fore" name should be certified as soon as given. The town clerk and health officer will supply cards and instructions for making such returns.*

MARRIAGE-RECORD.— *The person who legally attests the marriage ceremonial must certify his official act in the prescribed form, after which it is his duty to make sure that the record and certificate are placed in the hands of the registering officer within three days after the marriage.*

☞ *The registration of births, deaths and marriages, the examination of certificates and the granting of burial permits, shall be without charge to the families to whom they relate.*

The foregoing five paragraphs, in *italics,* should be published among the regulations of every board of health and every registry office.

As the State Board will enforce the law in relation to registration by the local boards, each local board and registering officer should faithfully instruct and induce the people to comply with the regulations for the registration of deaths, births and marriages, and the regulation of burials and lawful transit of remains of the dead.

The records of the three chief epochs of the human life require *permanent registering* as much as any records of real estate, such as deeds, mortgages, etc.; and as it is the law of the State, this law should be enforced.

NOTE.— The registry clerks and health officers will please to keep a correct list of the *persons* and *proofs,* to be called for, concerning delinquencies and violations of the registry laws, as the statutes and regulations relating to this subject must be complied with. Please let the list, etc., show,—

Names and residence of delinquents.—

Date and nature of records wanted.—

Date of registry clerk's official notice to the delinquents.—

Each registry office will transmit a copy of its records of these *delinquency cases* to the State Bureau on the 15th of each month, with the original copies of *registered records* of the previous calendar month.

[No. 49.]

STATE BOARD OF HEALTH OF NEW YORK.

HELPS AND RULES FOR COMPLETE AND PERFECT REGISTRATION OF VITAL STATISTICS.

Registry officers, health officers, boards of health and clerks of county boards of supervisors have recently asked for information which is given on this page. Physicians, ministers, school-district officers and other citizens ask of them, as well as of the State Board of Health, information on these subjects, and they will be fully answered in this circular.

As nearly all the towns in the State have organized their local boards of health, and assumed the supervision of registration of deaths, marriages and births, and the recording and regulation of burials, and as the village and city boards of health uniformly supervise this service, the system is sufficiently complete to warrant the following *suggestions and rules* for the guidance of registry clerks and all other persons who have any responsibility for, or supervision of, the records and registration.

Perfect and complete records. — The certificates must be perfect in whatever is entered upon them, and they should be as complete as possible: It is important *that all names be correctly spelled and distinctly written;* that the entire certificate be written in *black ink*, and that the registry officer should verify all that is written by indorsing his *signature* and *title*, with *date*, on the back, as he receives and files the certificates; *that the family or friends who write or give the facts* certified concerning the persons to whom the certificate in any case relates, should correctly *give full names*, also the *maiden name of mother* and the birthplace of parents (if known), and the true residence of the persons *concerning whom the record is being written.*

Either a professional attendant, or an official person (who lawfully may), *must certify* or attest the correctness of every certificate. *School-clerks and mere neighbors cannot do this.* Registry officers will please cause all defects or neglects to be *amended within a week from the discovery of them*, in records received.

Registry officers will indorse the date and their signature on the back of every certificate the day it is received, so that the prompt registry (by dating the return) required by law, shall be complied with, and errors be prevented. Each certificate must then receive on its face, its true register No. [No.....]

The certificates of still-births insure orderly burials and, after such use, they are to be filed away by the registry officer, and must not be entered in the ordinary death registers.

Burial permits must be required before the interment. — Every town, village and neighborhood will be kept supplied with blank Permits — in the hands of officers whom the laws authorize to use them. The local health officer and board of health will regulate this matter.

[No. 50.]

State Board of Health of New York.

The Family and Persons first Responsible should Write out the Personal and Family Record of each Birth, Marriage or Death; and Immediately Hand the Same to the Professional or other Attestant, to Complete, and to Certify by his Signature.

The family and friends have the first interests and public responsibility in regard to the completeness and accuracy of the personal records and the dates which should be registered. Therefore this, which is the greater part of every certificate, should be carefully written out in the house where the recorded event occurs, and should be given to the professional attestant for him to complete and finally certify. The laws require the professional attendant's certificate, and the State Board of Health advises that the family and friends give to him, in writing, all the facts required for the personal and family record.

A Birth-record should be written out and made entirely ready for the attesting signature within 36 hours after the event. If there was no professional attendant, the parents, or any responsible witness, should certify the record so written out. If the given name of infant is not decided upon before the certificate is sent to the registry clerk, it must be sent to him on a separate card, as soon as given. Every registry clerk and board of health has the cards for distribution, which the State Bureau has prepared for this purpose. Parents will bear in mind that upon their accuracy, carefulness and punctuality in the making out of the birth-record, and causing it to be certified and brought to the registry office, great interests of the child and family may depend. The parents must see to it that the record is certified and brought to the local registry office within three days after the birth.

Marriage-records should, in all cases, be written out by the bride and groom and be ready for the attesting signatures of witnesses and the person who solemnizes the ceremonial. Though the statutes require the clergyman, or other person who professionally certifies the facts and ceremonial, to cause such record and certificate to be delivered to the registering officer, the Laws of 1880 and 1882 require the State sanitary authorities to prepare the forms and methods for making the records and registry of marriage, birth and death complete throughout the State. The couple who enter upon matrimony must furnish their required personal records and be prepared to offer the proper witnesses and signatures at the time of the ceremonial; and the official who certifies, should do so immediately after the ceremonial of marriage, and he who so certifies is required by the statute to make sure that his certified record is delivered to the registering officer within three days.

Any corpse which is *brought into* a town, village or city for burial, must be interred in accordance with the *sanitary and burial regulations* of such place, and must be accompanied with a lawful Permit, *or have one granted on the spot.* Such a record of the burial belongs to such place, and the lawful permit must there be filed with the cemetery keeper, and by him or a carrier must be filed in the local registry office at the proper time.

A transit permit for transportation into or beyond the county limits may be issued, upon receiving a suitable certificate of death, in any case where public carriers or other responsible persons ask for such a Permit.

Records of permits and burials should be so kept that the precise *place of burial* can be readily traced in future. Registry officers and cemetery-keepers must see to this.

All local registry officers will make full returns on or about the **15th** of each month, inclosing the *certificates registered in previous calendar month*, together with *given-name cards* as received and registered. *Pack flat*, in full file-form. Packets weighing *less* than **5** *ounces* should be sealed and sent by mail. If weighing *over* **5** *ounces*, they should be sent by express, C. O. D., inclosed in the addressed envelopes.

Every packet will be acknowledged by postal or letter, and the postage and addressed envelopes, due, will be sent *every* **3d** *month* or oftener.

Official transcripts of any record that is registered will be issued from the State Bureau, with seal, without charge, and may be issued by a local registry officer. *New supplies* of any blank forms, registers or index books can be obtained of the printers at their printed rates. Any of the *numbered papers and card-forms, of the State Board*, are sent free.

DEATH-RECORDS must be made complete as possible (upon the first **10** lines, as numbered upon the official certificates of death), by the person or persons best informed concerning the deceased, and having the chief responsibility for the burial. The signature of the person who makes the record to this extent, should be written under the tenth line. The statutes make it a duty of the medical attendant (when there is one), to keep such a record, and to furnish a copy of it, duly certified, to the burial permit officer and the registry clerk, as the lawful voucher upon which a permit for burial shall be granted and the record of every death secured for public registration. The blank forms for death certificates and for burial and transit permits are now generally distributed in every town, village and city in the State. The local boards of health have full control of all that relates to approval of the death certificates, the granting of permits and the regulation of burials. The required record of the deceased, and the report of the death should be made to the medical attendant, for his certification, within **36** *hours after death*, and the certificate should be presented to the burial permit officer at least half a day before the hour appointed for the burial.

EXPLANATORY.— The *professional attendant* is made responsible, under the laws, for securing and certifying the facts which are required for public registration, yet the laws require this duty from him to the State and the people because, in the existing conditions of society, he more certainly than others can make sure of the personal records, and should certify them as one of the lawful conditions upon which the State endowed him with the authority and franchises of his professional position. His professional request for any records which should accompany his certificate, is to be promptly and fully complied with. In the absence of professional attendants the statutes authorize Justices of the Peace, with competent witnesses, to obtain and attest the records. Local boards of health have the right to canvass for and gather up any delayed returns of records for registration; and they may, after their publication of regulations, inflict fines for neglect or refusal to make and send forward the records required for registration.

IMPORTANCE OF THE CERTIFICATES AND THEIR PUBLIC REGISTRATION.— Every family, as well as every physician, minister and magistrate would promptly do all that is necessary to make out and complete the records and registry as the laws require, if the great value of them were as well known as that of the public records of estates and other property. These records of each of the three epochs of human existence and family lineage are of more permanent value than the registry of deeds and mortgages. They are necessary to promote correct sanitary knowledge, and to aid in the protection of great interests of life and social welfare throughout the State.

Respectfully submitted to health officers, registry clerks, professional attendants and families in the State of New York;

THE SANITARY PAPERS RELATING TO THE PREVENTION AND CONTROL OF CONTAGIOUS DISEASES.

The series of papers issued under the above heading for general distribution, have all been printed upon single sheets or leaflets, and as they are in untechnical phrase, and have proved to be of great utility, the Board has directed their republication in this place.

[No. 13.]

STATE BOARD OF HEALTH OF NEW YORK.

HINTS FOR PREVENTING DIPHTHERIA.

This brief memorandum of sanitary duties is designed for use of families and communities exposed to diphtheria, and is published by the State Board of Health to aid in the repression and prevention of this terrible disease.

Issued by order of the Board,
ALBANY, *March*, 1881.

EDWARD M. MOORE, M. D.,
President.
ELISHA HARRIS, M. D.,
Secretary.

Diphtheria is an infectious and dangerous disease, readily communicated by the sick and by clothing from the sick-room. The room itself is apt to retain and communicate the infection. Its spread is prevented by great care to have the sick, their clothing, and the persons who nurse them, kept entirely away from others, especially from children : and to such care should be added cleansing.

The sick must be nursed in a clean and airy room, on a floor where there are no other children.

Every cloth and cup, and all clothing and bedding used in the sick-room, must be cleansed and disinfected before being handled or used by other persons. The house itself must be disinfected as soon as the sick recover or die. Cleanliness and ventilation should be enforced night and day.

The Cleansing and Disinfection.*—Open windows, and open fireplaces—with fire in them day and night—protect the sick and all who attend them. The cloths and dishes used by the sick should be put into boiling-hot water, as soon as removed, without being taken to another room. The soiled clothing from the sick and the bed, that can be boiled, should be thrown into a disinfecting fluid, made by dissolving four *table-spoonsful of sulphate of zinc* ("white vitriol"), and two table-spoonsful of common salt in a gallon of boiling water (one-fourth pound of sulphate of zinc to two ounces of table-salt to the gallon). When the time for washing comes, thoroughly boil the clothing, etc., before washing.

The woodwork, chairs and stools of the sick-room should be washed with the disinfecting fluid. The chamber vessels and spit-cups, used by the sick, should be drenched with this fluid before they are removed from the room.

The grounds surrounding the house, the ditches and drains and the privy and chip-yard, must be drenched with the cheap solution of green copperas (sulphate of iron), made by dissolving five pounds of the dry copperas in a large pailful of water.

As soon as the sick-room is vacated let it be fumigated with sulphur, and let all rugs, beds, blankets and other furniture remain in the room and near where the kettles or pans of sulphur are placed. From two to five pounds of sulphur, or broken brimstone, laid upon ashes and coals in iron vessels (set into large tubs that contain a few inches depth of water), will be necessary for fumigating an ordinary chamber. The physician will direct how to do this; but it will be well done if the rooms to be fumigated are so closed that the suffocating fumes do not escape from flues and crevices, and the burning of the sulphur at last ceases for want of fresh air before all the sulphur is consumed. Let the fumes be kept shut in all day. Finally, let all plastered portions of the room be well white-washed with fresh-slacked lime. Let the bottom and sides of cellars be sprinkled thickly, and repeatedly, with quicklime. All house-drains, ditches, filthy grounds, garbage-tubs, and decaying materials should be cleared out and disinfected, and waste-pipes, drains and sewer connections so improved that no gases from them shall enter the house.

The sick should be nursed by adults who have no children about them. Avoid the patient's breath and matters ejected in coughing.

Children and visitors should keep away from the house where there is diphtheria. The burial of those who die should be strictly private The corpse should be wrapped in a sheet saturated with the zinc disinfectant.

Children who recover from diphtheria should not visit or be visited, attend school or meetings, nor mingle with others of the family from which separated, until the physician permits.

The mother, father or other member of a family, who needs to become the attendant upon the sick when quarantined for diphtheria, should

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* See card of Instructions on Disinfection.

Note.—Perfect drainage and cleanliness, thorough ventilation and dryness, and repeated disinfection of all the house drains and foul places are necessary to the safety of the family and the neighborhood.

☞ Ask your physician to notify the local health officer of the occurrence of diphtheria, also to inform the State Board of Health concerning the cases and discovered causes.

practice all possible precautions to prevent spreading the infection in the family. Nurses of such patients should keep away from other families and from other children of the same family.

It must be remembered that not only the mild cases, but the convalescent, may and frequently do infect others fatally, and that by this means diphtheria is thoughtlessly spread from place to place.

It is a public as well as domestic duty to apply these Sanitary Rules wherever a case of diphtheria occurs. This disease should be treated as an enemy to be conquered in every house it enters.

[No. 14.]

STATE BOARD OF HEALTH OF NEW YORK.

SANITARY RULES FOR PREVENTING SCARLET FEVER.

The State Board of Health of New York directs this Memorandum of Instruction and Rules to be issued for the benefit of families and neighborhoods throughout the State. The card of Instructions on Disinfection accompanies this.

EDWARD M. MOORE, M. D.,
President.

ALBANY, *March*, 1881.

ELISHA HARRIS, M. D.,
Secretary.

Scarlet fever is an infectious and dangerous disease. The mildest case may spread its fatal infection, and cause the most malignant cases.

The danger of communicating this disease continues during convalescence as well as in the height of the fever. Whatever is discharged or comes from the patient is liable to infect persons who have not had scarlet fever. The clothing, furniture and the air of the sick-room may impart the infection. Clothing, bedding, closets and closed rooms may retain the infectious poison for a long time. Strict sanitary rules are urgently required on this account.

Parents, teachers, school officers and all persons who have the care of children can do much to guard against the occurrence of infection, and they frequently are responsible for the spread of scarlet fever. The State Board of Health appeals to all who are thus responsible to do whatever they can to prevent this disease. This is to be attempted by the isolation or quarantine of the sick, and by disinfection, cleansing and ventilation.

ISOLATION AND QUARANTINE OF THE SICK.

The sick with scarlet fever should be placed in an upper room with the best ventilation, and kept secluded from all except those who have charge of the case.

Children in the family not affected must be prevented from mingling with other children, and especially must be kept from schools and meetings. Children of other families in the same house should submit to this rule, yet it is earnestly recommended that uninfected children be sent away from the house in which there is scarlet fever, to families in which there are no persons liable to the disease.

Infected Materials.—Carpets, curtains, trunks, clothing and all stuffed furniture and bedding should be removed from the room, and the part of the house in which the sick, or dead, with scarlet fever are to be placed.

The contagious matter thrown off from the surface of the patient's body is to be controlled as much as possible by such anointing of the body with oil, vaseline or lard as the physician may direct, and especially by disinfecting all discharges as they issue from the patient, and placing all clothing, towels, etc., removed from the sick, immediately in the disinfecting fluid of zinc-salt.

Disinfection.— Apply the methods and means described in the circular on disinfection. Follow the same rules as for diphtheria. The disinfectant made by dissolving one-fourth pound sulphate of zinc and two ounces of salt in a gallon of water is the best and cheapest.

Thorough cleansing and ventilation must be enforced. All drains, sewers and privies about the house should be kept thoroughly disinfected.

Restrictions upon Convalescents.— As the liability to infect others continues as long as there is any desquamation, or peeling of the skin, and possibly even longer, the recently sick should not attend any school, church or company, or ride in a public conveyance while the skin is peeling, the throat and eyes sore, or any symptoms of dropsy are present. A competent physician should decide what special cleansing by warm baths with vaseline-soap or chlorinated washes should be used. In all cases let the physician decide, and certify, in writing, that the patient is safe to others, before any child recently suffering from scarlet fever is permitted to attend school.

Whoever attends upon scarlet fever patients, and whoever enters the room where they are, should not mingle with persons liable to take this fever, without changing all clothing, after thorough ablution of hands and head.

Burial of the dead from scarlet fever should be strictly private, with the corpse wrapped in a sheet saturated with the zinc disinfectant, or inclosed in an air-tight coffin. When a death from this disease is announced in print, the notice should state the cause as "from scarlet fever," to prevent attendance at the funeral or visits to the house.

A destroyer of precious lives, and a most harmful and permanent cause of injury to the bodies of children who survive the attack, scarlet fever must be treated as an enemy of childhood and of the family. We must endeavor to "stamp out" and exterminate the known contagion by which it spreads. Separation, purification, ventilation and disinfection of the sick and all that pertains to them, as well as the rooms and bedding they have occupied, and the special sanitary care of all persons who have been exposed or near to them, are necessary for arresting the spread of this disease. Promptly report all cases of scarlet fever to the nearest health officer, and at once order the isolation and sanitary care of the sick as advised by these rules and the physician.

[No. 15.]

STATE BOARD OF HEALTH OF NEW YORK.

SANITARY PRECAUTIONS FOR PREVENTING THE SPREADING OF INFECTIOUS DISEASES.

The State Board of Health publishes this Memorandum of Sanitary Precautions against the spreading of Contagious and Infectious Poisons, because the most of them can be "stamped out," and all of them can be controlled.

E. M. MOORE, M. D.,
President.

ALBANY, *April*, 1881.

ELISHA HARRIS, M. D.,
Secretary.

Cleanliness and ventilation are in all cases and everywhere of the first importance. The diseases which are spread chiefly from place to place and from person to person by means of their own infection or contagion are to be regarded and treated as enemies, to be resisted and stamped out. The propagation of some of them with the help of local causes, seen or unseen, and the fatality, as well as spread, of each one of them is increased by personal uncleanliness and local unhealthfulness. Diphtheria, measles, scarlet fever, typhoid fever, puerperal fever and small-pox are the most pestilent of these infectious diseases in this State. But typhoid fever and malignant cholera are infectious by means of excremental matters rather than from bodily emanations. Typhus spreads by its personal contagion, and it originates among crowded and uncleanly people. These diseases and all infections and contagions require disinfection and all sanitary precautions that prevent infection.

Small-pox, scarlet fever, diphtheria or measles.—The patient should be kept in a separate room (preferably on an upper floor) from which, if possible, carpets, curtains, stuffed furniture, clothing and other articles not required for immediate use should be removed beforehand; and no person except the physician, nurse or parent should be allowed to enter the sick-room, or to touch any of the articles used therein, until after thorough disinfection.

To disinfect clothing, etc., in the sick-room.—Keep in the room a tub containing a quarter of a pound of sulphate of zinc and two ounces of salt to a gallon of water. All bed linen, handkerchiefs, etc., used about the patient should be allowed to soak in this solution for at least an hour before removal from the room and afterward be thoroughly boiled, separate from the rest of the family washing. Never send such articles to a public laundry.

To disinfect discharges from the patient.—Use the same disinfecting fluid as in disinfecting clothing, but three times stronger, or use copperas water, made by dissolving a pound and a half of copperas in a gallon of water. The latter answers for all excremental discharges, while the former is best for all articles of clothing and furniture. All

vessels used in the sick-room should be disinfected with one or other of these disinfecting fluids, unless immediately immersed in boiling water. Disinfect the discharges and clothing immediately.

Typhoid fever.—The poison lies in the discharges from the bowels, which should be at once disinfected with the solution of the zinc-salt or of copperas. Particular care should be exercised to prevent any possible contamination of sources of drinking water with these discharges. Bed clothing or other articles soiled by the evacuations should be treated with the zinc solution and be boiled.

Dysentery and cholera.—Adopt the same regulations as in typhoid fever.

Typhus fever.—Enforce free ventilation, and disinfection of clothing as above described. Attend to the fumigation of the sick-room and its bedding.

To prevent the body of the patient from spreading contagion.—In the eruptive diseases, especially in scarlet fever, the patient's body should be anointed at least twice a day with oil, lard, or vaseline, containing about ten grains of carbolic acid or of thymol to the ounce. This process should be maintained until all bran-like scaling of the skin is at an end. The zinc-salt solution should be used as directed. Before again associating with unprotected persons, the patient should have several complete ablutions, including thorough washing of the hair with soap or borax; and none of the clothing worn for several days before the disease declared itself should be again used until thoroughly disinfected, and ventilated in the open air several days.

Avoid visiting houses where there are any of these diseases.—Occupants of such houses should not visit.

Disinfection of houses and apartments.—Fumigation with sulphur is the only practicable method for disinfecting the house, as well as furniture, bedding, etc., that cannot be steamed or boiled. For this purpose the rooms to be disinfected must be vacated. Close the rooms as tightly as possible, place the sulphur in iron pans supported upon bricks in wash-tubs containing a little water, set it on fire by hot coals, or with the aid of a spoonful of alcohol, and keep the room tightly closed twenty-four hours. For a room of dimensions equal to ten feet square, or one hundred square feet of floor-space, at least two pounds of sulphur should be used; for larger rooms, proportionally increased quantities.

After fumigation, the freest possible ventilation should be practiced. All woolen clothing, silks, furs, stuffed bed-covers, beds, and other articles which cannot be treated with zinc solution should be hung in the room during fumigation, their surfaces thoroughly exposed, and their pockets turned inside out. Afterward they should be hung in the open air, beaten and shaken. Pillows, beds, stuffed mattresses, upholstered furniture, etc., should be ripped open, the contents spread out and thoroughly fumigated. Carpets are best fumigated on the floor, but should afterward be removed to the open air and thoroughly beaten. Many of such articles may be disinfected in an oven or steam-heated tank, at a temperature of from 212° to 250° Fahr., maintained for five or six hours.

Disinfection of premises, etc.—Cellars, yards, stables, gutters, privies, cess-pools, water-closets, drains, sewers, etc., should be repeatedly and profusely drenched with copperas solution, which is easily kept ready

for use, at full strength, by hanging a basket containing about sixty pounds of copperas in a barrel of water, and renewing the supply from time to time.

Corpses should be wrapped in a sheet wet with the strongest disinfecting solution, and buried as soon as practicable.

Warning against typhus. — The typhus contagion, wherever it is found, threatens much harm. The local boards of health should require their health officers to be watchful and ready to adopt all necessary sanitary precautions for isolating and controlling this disease at its first appearance. Tramps should not be permitted to enter dwellings and lodging houses, as they wander about. They should be cleansed and controlled by Superintendents of the Poor. Sanitary officers should order whatever is necessary. Every typhus patient should be so quarantined and provided for as to prevent the spread of infection. All lodging houses and dwellings where fever is suspected should be thoroughly cleansed; and wherever a case of typhus occurs the disinfection of the clothing, bedding and sick rooms should be as prompt and thorough as in cases of small-pox. The sick and whatever pertains to them, as well as the remains of the dead from contagious diseases, must not be removed from one place to another without written permission of all the health boards of the several places.

[No. 16.]

State Board of Health of New York.

INSTRUCTIONS FOR DISINFECTION

[*As Prepared under the Direction of the National Board of Health.— Issued by the State Board of Health of New York.*]

Disinfection is the destruction of the poisons of infectious and contagious diseases.

Deodorizers, or substances which destroy smells, are not necessarily disinfectants, and disinfectants do not necessarily have an odor.

Disinfection cannot compensate for want of cleanliness nor of ventilation.

I. *Disinfectants to be Employed.*

(1.) Roll sulphur (brimstone) for fumigation.
(2.) Sulphate of iron (copperas) dissolved in water in the proportion of one and a half pounds to the gallon : for soil, sewers, etc.
(3.) Sulphate of zinc and common salt, dissolved together in water in the proportion of four ounces sulphate and two ounces salt to the gallon : for clothing, bed-linen, etc.

II. *How to Use Disinfectants.*

(1.) In the sick-room.—The most available agents are fresh air and cleanliness. The clothing, towels, bed-linen, etc., should, on removal

from the patient, and before they are taken from the room, be placed in a pail or tub of the zinc solution, boiling-hot if possible.

All discharges should either be received in vessels containing copperas solution, or, when this is impracticable, should be immediately covered with copperas solution. All vessels used about the patient should be cleansed with the same solution.

Unnecessary furniture, especially that which is stuffed, carpets and hangings, should, when possible, be removed from the room at the outset; otherwise, they should remain for subsequent fumigation and treatment.

(2.) Fumigation with sulphur is the only practicable method for disinfecting the house.—For this purpose, the rooms to be disinfected must be vacated. Heavy clothing, blankets, bedding, and other articles which cannot be treated with zinc solution should be opened and exposed during fumigation, as directed below. Close the rooms as tightly as possible, place the sulphur in iron pans supported upon bricks placed in wash-tubs containing a little water, set it on fire by hot coals or with the aid of a spoonful of alcohol, and allow the room to remain closed for twenty-four hours. For a room about ten feet square, at least two pounds of sulphur should be used; for larger rooms, proportionally increased quantities.

(3.) Premises.—Cellars, yards, stables, gutters, privies, cess-pools, water-closets, drains, sewers, etc., should be frequently and liberally treated with copperas solution. The copperas solution is easily prepared by hanging a basket containing about sixty pounds of copperas in a barrel of water.

(4.) Body and bed clothing, etc.—It is *best* to *burn* all articles which have been in contact with persons sick with contagious or infectious diseases. Articles too valuable to be destroyed should be treated as follows:

(*a*.) Cotton, linen, flannels, blankets, etc., should be treated with the boiling-hot zinc solution; introduce piece by piece, secure thorough wetting, and boil for at least half an hour.

(*b*) Heavy woolen clothing, silks, furs, stuffed bed-covers, beds, and other articles which cannot be treated with the zinc solution should be hung in the room during fumigation, their surfaces thoroughly exposed, and pockets turned inside out. Afterward they should be hung in the open air, beaten and shaken. Pillows, beds, stuffed mattresses, upholstered furniture, etc., should be cut open, the contents spread out and thoroughly fumigated. Carpets are best fumigated on the floor, but should afterward be removed to the open air and thoroughly beaten.

(5.) Corpses especially of persons that have died of any infectious or malignant disease, should be thoroughly washed with a zinc solution of double strength; should then be wrapped in a sheet, wet with the zinc solution, and buried at once.

Metallic, metal-lined, or air-tight coffins should be used when possible; certainly when the body is to be transported for any considerable distance.

The chemicals here recommended are simple, safe and effectual; they are cheap and can be obtained in every town, and used in the ways here described, they will destroy contagious and infectious matter, and the directions for fumigation, boiling, ventilation, cleansing and drying can be carried out in any house; but let it be remembered that there are no substitutes for cleanliness and fresh air.

The State Board of Health advises that these Instructions be followed.

[38.]

STATE BOARD OF HEALTH OF NEW YORK.

PREVENTION OF SMALL-POX.

Duties of the Local Authorities — Health Officers and others.

The State Board of Health, at its meeting December 13, 1881, directed that the health officer and Board of Health in every place where there is small-pox, in this State, shall receive from the secretary of the State Board whatever aid this Board can give for controlling the contagion; and it is required of all health authorities and other persons who know of any outbreak or case of small-pox, that they shall report the facts immediately to the secretary of this Board and to the nearest health officer.

Small-pox is liable to appear in any place where there are unvaccinated persons. It is dangerous to life, and is a misfortune which causes loss and great disturbance in the affairs of any community that does not immediately secure to every inhabitant the necessary protection by vaccination and re-vaccination, and by thorough quarantine and disinfection of the contagion.

The laws in this State require:—

(1.) That all who are in attendance at the public schools shall present evidence of their being vaccinated; also that after ten days' notice any person may be excluded from school who is not so protected against small-pox. (Chap. 438, Laws of 1860.)

(2.) That it shall be the duty of all local Boards of Health promptly to report to the State Board of Health every case of small-pox, and to immediately provide thorough and safe vaccination for all persons who need the same, within the jurisdiction of said local Board; also isolate and keep in quarantine, and to regulate, prohibit or prevent communication or intercourse with persons, houses and places that have small-pox.

(3.) That the local Board of Health shall suitably provide places and means for the complete separation and sanitary care of infected persons and things.

Vaccination is a public duty for the protection of the whole community as well as of each individual and family; and it is so necessary to secure its protection in all places and for all classes of people that none have a right to neglect it for themselves, their families, the public schools or the community. The State Board of Health has directed its secretary to give whatever information or advice is needed to secure the most perfect vaccine matter and the speediest and best application of it whenever and wherever it is required.

The State Board advises and requires that the law for vaccination of all who attend schools shall be faithfully observed; and

That every local Board of Health be prepared against small-pox,—

By an agreement with all physicians to secure perfect vaccination in every household where they attend;

By instructions to health officers to ascertain who are un-vaccinated and exposed;

By notifying the State Board of Health at once, when and where small-pox appears, and by telegraphing or writing to this Board what their wants are; and

By requiring prompt compliance with the local Board's orders, and by immediately instructing and aiding the community in regard to the same.

The State Board will co-operate with the local Boards of Health : —

By immediately answering and complying with requests from local authorities; —

By telegraphing and writing to secure the best means of vaccinating;

By sending to local authorities brief suggestions for immediate use in the community; —

By supplying the few forms for records and reports which are required, together with the Board's printed cards of information relating to vaccination, disinfection, and the suppression of the contagion ; and

By guaranteeing the payment for limited requisitions, by the local Boards of Health, for fresh and pure vaccinal lymph from heifers, to meet any urgent necessity that cannot be provided for by the local authorities at the moment,— the said authorities then promising payment.

A Word of Suggestion and Warning to All.— Every infant should be vaccinated before it is six months old, unless a good physician advises to the contrary. Every person who has passed the age of twelve years should be re-vaccinated with fresh heifer virus, to test the fact of complete protection against small-pox ; and those who have had that disease should be vaccinated, as it may attack a person who was marked by it, as well as a person who has been only once vaccinated. Sufficient vaccination removes all liability to the disease. For this purpose re-vaccination is earnestly advised. Vaccination with lymph from clean and healthy inoculated heifers causes no disease. It can be obtained fresh every day from perfectly healthy calves, and within a day or two can be at hand for use in any town in this State, at a cost of from seven to twelve cents for each "slip" or "point." The Board of Health in each of the cities is earnestly requested to keep such a supply of *vaccine* at hand that it can instantly meet any exigency, or furnish a neighboring community with a few points of the lymph at cost. It should be inserted by physicians only, and they should examine the result at the end of seven days.

What to do when small-pox occurs :

(1.) Place the sick in a separate room from which all clothing, carpets, upholstered stuff and the quilts and feather bedding have been removed. In such a room with open windows and an open fire, keep the sick and nurses entirely separated (quarantined) from all other persons until the doctor and health officer takes charge. Then follow their requirements.

(2.) Let all persons who are near the sick be immediately vaccinated afresh, and let it be understood from the first that all bedding, clothing, towels and cloths which are touched or used by the sick shall be burned; and every place where the sick are, and where there is any thing that has come from or been exposed to them, shall be thoroughly disinfected as soon as possible.

(3.) A separate place, or even a hut constructed for the purpose, should be so prepared as to be safer for the sick than any ordinary dwelling rooms; that is, that the fresh air and sanitary care and nursing shall be the best possible; and that it shall be an apartment and locality from which th contagion will not be spread abroad.

(4.) That no delay or objection shall prevent the vaccination of all persons who have been in any manner exposed, or suspected of exposure, to the contagion. That if fresh vaccine is not at hand, the physician, or the health officer shall telegraph to the nearest person who can supply it. If the request is not immediately complied with, then telegraph the State Board of Health.

(5.) In case of death wrap the corpse in a sheet saturated with the strongest disinfectant, and bury it in a deep grave within twenty-four hours, and without a public funeral.

(6.) Disinfect according to the rules given in the State Board's circular on disinfection No. (16).

Special recommendations.

The State Board of Health recommends that in whatever city, village or town small-pox appears, the entire neighborhood in which there has been any communication with the patient, or exposure to the contagion, shall be notified that the *State Board of Health requires that every person shall be protected by vaccination;* that whatever materials are infected shall be destroyed by fire or shall be kept in the zinc and salt solution, and be boiled without removal from the premises; that rooms and furniture suspected of contagion shall be fumigated with sulphur as directed by this Board's rules; that tramps and other persons suspected of infection with small-pox shall be taken in charge by the police and the sanitary authorities; that employers shall advise their companies of employed persons to be vaccinated; and, in case of small-pox in their vicinity, to make such vaccinations one of the conditions of being continued in employment. This rule should be strictly enforced in all manufactories that make goods that are liable to become infected, and especially should be a standing regulation in public houses, and in all classes employed on railroad trains and passenger vessels.

Form of report to the State Board of Health and to the Local Board

(Name)

.....is sick with small-

(Name of house and place)

pox (or varioloid) at..... .....The

(Date)

eruption began.....

It is believed the contagion was taken at.....

by exposure to.....

No. of persons now exposed to patient.....

Who has the responsible care and custody of the case?.....

(Signed).....

(P. O. address).....

REQUEST:_____

Such a notice, with the request that needs to be made, should be sent to the health officer or the nearest member of the local Board of Health. If the physician is already in attendance he should sign it; but if no physician has reached the patient, the householder and any other person that has charge of the case should sign this first report and request, and send it to the family physician or to the health officer. The physician who first sees the case or the health officer, should write out such a brief report and his own request and send it by mail to the secretary of the State Board of Health. If in a place where there is no local authority, health officer or physician, send the report by first mail to the secretary of the State Board of Health.

Subsequent Reports. The physicians and the Health Officer will please agree upon the report which shall be made to the State Board on its card (No. 31) for reporting the history of cases of small-pox.

Vaccination Records and Reports. The form of records of inspection and vaccination prepared by the State Board of Health for the use of health authorities and physicians, is given on the leaflet marked [No. 39]. Every Health Officer is earnestly requested to make and preserve such a record, and to transmit a copy of it to the State Board. Physicians who vaccinate ten or more persons at any time during the year are likewise requested to make up and preserve this kind of record [No 39], and to give the State Board of Health a copy. The blank form will be furnished and the postage supplied for such reports, on notice.

Vaccination, properly applied, is as effective now as it ever was, but the medical and sanitary care to secure the perfect results which give protection are so vitally important, that the records of experience are to be henceforth preserved and studied to enable the people to obtain and voluntarily seek the benign protection which is needed against the loathsome contagion which threatens every person who is not well vaccinated. Prudent and timely action will prevent the attack of this blighting pest, as well as stamp it out. Panic and delay are worse in the presence of small-pox than in the midst of a raging conflagration in a city; and the vaccinator and sanitary inspector disarm the contagious destroyer as readily as the fire brigade — at a touch of the fire keys — will suppress flames, before panic can occur. The timely action, controlling means, and suitable methods prevent panic and loss in the presence of small-pox. For this reason vaccination is a public duty, and Sanitary Law to provide for it and prevent contagion is a necessity.

Published by order of the Board,

ELISHA HARRIS,

Secretary.

[No. 41.]

STATE BOARD OF HEALTH OF NEW YORK.

MEMORANDUM OF RULES TO BE ADOPTED TO PREVENT THE SPREADING OF CONTAGIOUS DISEASES IN SCHOOLS.*

The following sanitary rules are recommended by the State Board of Health for adoption by all School Boards and Trustees. They are presented in a form suited for direct transfer to the Public School Regulations, with the exception of the bracketed [ ] portions, which may depend on local circumstances for their application or feasibility:

I. Every person entering the public schools of ..... must give satisfactory evidence of protection against small-pox, or be excluded until the rule is complied with, as provided by the statute of 1860. [See synopsis of this statute as appended.]

II. The fact of vaccination and protection should be entered with each name on the school record [and on transfer or promotion lists, so as to avoid further inconvenience to the pupil].

III. Persons affected with diphtheria, measles, scarlet fever, or small-pox, must be excluded from school until the school officer's permission is granted.

IV. Intercourse between the school and family or house where there is a case of any one of these contagions, must be forbidden until the official permission is given.

V. It will be the duty of every teacher and school officer who discovers a case of any of these contagious diseases, to cause the fact to be immediately reported to the local Board of Health. [The Board of Health should assume the sanitary duty of quarantining and disinfecting, as well as that of permitting the pupil's return, etc.]

VI. If a child is ascertained to have attended school while affected with any of these contagions, the local Board of Health shall be requested to direct the proper disinfection of the school premises. In the absence or delay of such sanitary authority, the physician in attendance, with one of the school officers, should direct this duty in accordance with the rules for Disinfection and Cleansing given in the State Board's Circular, No. 16.

VII. Rule III must invariably include all persons from the family where the case of sickness exists. [It should extend, also, to all persons living in the same house, at the discretion of the local Board of Health.]

VIII. [If there is no local Board of Health, the school authorities, with medical advice, if possible, should decide the question in brackets under Rule VII, and should take the advice and assume the duties mentioned in Rules V and VI.]

IX. [It is desirable that all cases known to the Board of Health

*Extracted from the Second Annual Report of the State Board of Health.

should be at once reported to the school authorities; and the latter should request the Board of Health to do so, and every teacher and school officer not only should promptly inform the health authorities of each known or suspected case of contagious disease, but should endeavor to have the sanitary rules enforced, and give proper information to the families concerned.] In such instances the duties of all these officers and persons are reciprocal, and none can prudently be neglected.

This memorandum is published by the State Board of Health, as information and advice,—earnestly recommended to the attention of all school officers and local Boards of Health; and as this Board has deemed it a duty to consult the State Superintendent of Public Instruction, every interest of the schools has been carefully considered, and the rights and duties of their pupils, trustees and boards of education duly regarded.

EDWARD M. MOORE, M. D.,
President.
ELISHA HARRIS, M. D.,
ALBANY, 1882. *Secretary.*

I heartily approve the foregoing, and commend the same to the common school trustees and others who are responsible for the welfare of the schools.

NEIL GILMOUR,
Superintendent of Public Instruction.

SYNOPSIS OF THE STATUTES RELATING TO CONTAGIOUS DISEASES IN TOWNS AND SCHOOL DISTRICTS.

The statute (chapter 438, Laws of 1860) makes the following provisions:

1. The trustees of school districts, and the school boards, are empowered to exclude from the public schools all unvaccinated persons until they are vaccinated.

2. This power may be exercised by trustees or boards, after passing a resolution to that effect and posting a notice for at least ten days in two or more conspicuous places within the limits of their respective school-board or district organizations. Such notice should offer free vaccination to those unable to pay. [The form necessary in such cases is given in the circular (No. 17) of the State Board of Health. That circular has been sent to every school-district clerk in the State.]

3. The trustees or board are further empowered to employ and pay a physician who shall make a list of all persons within the school ages that have not been vaccinated, and provide with certificates of vaccination those persons whom the said trustees or board directs. The local Board of Health is required, under chapter 431, of 1881, to supply all the necessary means for gratuitous vaccination, and it is declared to be its duty "*to make all needful provisions for immediately obtaining the necessary means for thorough and safe vaccination of all persons within the said jurisdiction who may need the same.*"

4. The amount expended is to be included in the annual tax bill. [The new law enables the town, village or city to meet the expense by its local Board of Health.]

5. The trustees of school-districts are required to include in their

annual report the number in their several districts between the ages of five and twenty-one who are vaccinated, and the number not vaccinated. [Every local Board of Health should require compliance with this law.]

REQUEST. — School Officers who receive this circular will please detach this *leaf*, fill in the names officially, and use it as a *posted notification* as soon as the Trustees or School Board shall have ordered the rule for Vaccination to be complied with.

[No. 17.]

VACCINATION NOTICE.

To whom it may concern:

At a meeting of the Board of Trustees, of School District No. —, of ————, N. Y., held ———— —, 1882, it was

Resolved (In accordance with the statute entitled "An act to encourage and provide for a general vaccination in this State," passed April 16, 1860), to exclude from the school any child or person who has not been vaccinated, and until such time when said child or person shall become vaccinated, and in pursuance of said act the said Board has designated (or agreed with) Dr. ————* to vaccinate all who may desire to attend said school, whose parents or guardians are unable to obtain such vaccination.

☞ The ten days' notice, required by law, is hereby given.

By order of the Board.

(Signed)

.....

....

* Or with the Health Officer, Dr. ————.

The State Board of Health of New York recommends to the Trustees, or Board of Education, in every school district in the State, that an order be made, and a provision announced, concerning the *vaccination that is required by law* for the protection of schools against small-pox. The above form of a *resolution* and posted *notice* is recommended to all school authorities.

By direction of the State Board of Health.

ELISHA HARRIS,

November 1, 1882. *Secretary.*

[Officers and friends of the Common Schools who receive these papers, will please examine this Circular and the list of inquiries, and favor the State Board with replies.

[No. 43.][a]

[Extract from No. 43 of the Series of Sanitary Papers.]

State Board of Health of New York.

NOTES AND CONCLUSIONS

UPON THE RESULTS OF THE INSPECTION OF SCHOOL-HOUSES UNDER THE COMMITTEE ON PUBLIC INSTITUTIONS AND UPON DR. LINCOLN'S SPECIAL REPORT.

The results of personal inspection are found to harmonize quite generally with the replies which have been sent in by school district officers relating to the health questions submitted by this Board in circular No. 35. These results of the inquiry, by means of the circular to school officers, are yet incomplete. They will be studied advantageously at the expiration of another year; for over 11,400 school districts in the rural parts of the State are day by day making their returns upon the questions of that circular.*

The conclusions reached by the committee, and by Dr. Lincoln who labored with it for a period of three months, are briefly summarized as follows:

1. Structural improvements are being made in the school-houses in many districts; there is a recognized attention to some of the requirements of health that have been neglected in the old school-houses.

2. The committee has found only about one in fifteen of the common school-houses well outfitted for protecting the health of the pupils. Even in that one there is oftener a neglect of sufficient ventilation than a suitable provision for it.

3. As a general fact, ventilation in the common school-houses is insufficient, and the means for it badly designed. When good, its excellence depends chiefly upon open windows and special facilities for controlling them.

4. Over-crowding is a prevailing fault, and even a wrong, in a majority of the school-houses which the committee and Dr. Lincoln have reported upon. The exceptions to this rule are noticeable in some of the diagrams printed in the report. In many of the schools the over-crowding is such as to endanger the health and life of the children, and taken in connection with defective ventilation, is a matter of momentous importance to the most loved and valued of lives in the families that send their children to the common schools.

5. In numerous towns, villages and cities, as shown in the report, there is a disgusting, degrading and harmful neglect of sanitary cleanliness in and about the school buildings, especially as regards the privies† and the means for the proper separateness and convenience of the sexes in relation to these matters.

* The report by the Standing Committee on Public Institutions presents notes and illustrations from the committee's inspections, in a chapter preceding this in the Second Annual Report.

†Some improvements in plans for the "hopper" and "tub" methods of sanitary closets for schools are shown on pages 156 and 412 in this Board's Second Annual Report.

6. Such neglect of cleanliness and decency should be interfered with and prevented by local sanitary authority. The public health, the bodily welfare of the children, and their moral safety alike require that this duty shall be attended to promptly, and by peremptory orders wherever necessary.

7. The supply of drinking water for the common school children is much neglected, excepting where hydrants, from the public water service, exist upon the premises.

8. Wardrobes or rooms, with pegs or brackets upon which to suspend outer garments and wet clothing, are seldom found suitably placed, and often they are neglected altogether.

9. Hand-basins, wash-stands or lavatories are wanting in a great proportion of the common school-houses.

10 The experiment of omitting the old practice of school recesses between the noon hour and the opening and closing of school, is being extensively adopted with doubtful — probably injurious — results.

11. The recreations needed by school children, under the name of light gymnastics or play, are confessed to be of great use to the younger classes in the common schools ; but it is found that the people do not suitably appreciate such physical exercises. It is desired, therefore, that teachers and parents should more thoroughly understand the reasons for encouraging and perfecting facilities for them.

12. There is found to be special reason for urging that girls shall not be deprived of the means of health which innocent and regulated gymnastics afford.

13. There is much neglect of, yet an increasing attention to, school seats and desks. This subject is found to need even greater attention than it is receiving.

14. The permanent injury to the eye-sight of school children is so frequent, and yet so preventable, that the known causes of such harm should be ascertained and provided against in every school. The proper lighting of the school-rooms, the best adjustment of seats, desks and black-boards, and the necessary regulations of study and exercise should be secured under competent medical advice, in which in every new or remodelled school-house the most approved lighting and the best arrangement of seats, desks, etc., for the protection of eye-sight, and for the general welfare of the pupils, should be provided.

15. The reception of vaccination by school children, under direction of their parents and the school officers, is found to have nowhere produced inconvenience or serious dissatisfaction. It seems eminently desirable, and certainly practicable, to secure general compliance with the statutes relating to the vaccination of school children as now administered under advice of the State Board of Health. (See circulars Nos. 17, 38 and 41.)

16. There is an obvious necessity for the promulgation and adoption of sanitary rules and regulations for the protection of health and life in schools as now recommended by the Board. (See circular No 41.)

EDWARD M. MOORE, M. D., *President.*

ELISHA HARRIS, M. D., *Secretary.*

[No. 24.]

STATE OF NEW YORK.

Concerning the Law to Prevent Adulteration of Food and Drugs.

OFFICE OF THE STATE BOARD OF HEALTH,
ALBANY, *June* 25, 1881.

At a meeting of the State Board of Health, held on the 23d of June, the Secretary was directed to issue a circular "calling attention to the provisions of chapter 407 of the Laws of 1881, and inviting information and suggestions to promote the objects of this law."

The State Board of Health is required by this law to take cognizance of the interests of health as they relate to food and drugs, and the adulterations of the same. For this purpose it has undertaken the necessary investigations, and it now appeals to the people of the State for information and suggestions that may lead to the correction of wrong practices which these provisions of law are designed to prevent.

Information and voluntary reports are specially desired concerning the following points:

In regard to Food-articles:

1. Whatever is known, or suspected of the adulteration of milk, condensed or uncondensed.
2. Whatever is known or suspected of adulterations and spurious materials sold as dairy butter.
3. Whatever is known or suspected of spurious or artificial liquids sold as wine.
4. Whatever spurious or adulterated substances are combined with or sold as sugar.
5. Whatever alkaline and other earthy substance is fraudulently sold as soda and its salts.
6. Whatever artificial mixtures are sold as baking powders, concerning which there is proof of injurious effects on health.
7. Whatever sugars, confections, or other mixtures, are known or believed to contain gypsum, or other earthy and mineral or metallic substances.
8. Whatever substances, mixtures or compounds recognized or sold as articles of food, drink, or medicine, are in, or to be placed in, the market for sale, and which are below the natural quality or strength, or which in the judgment of those concerned may be sold and used as articles of food, beverage, or medicine, in accordance with the exemptions provided in sections 3 and 4 of chapter 407.

In regard to Drugs or Medicines :

1. Whatever substances are known or suspected of any adulteration, or any depreciation from the *officinal* standards of the Materia Medica, and the Pharmacopœia, as designated in section 2, chapter 407 of the Laws of 1881.

2. Whenever a drug or compound, the composition of which is not established by a national pharmacopœia, shall be manufactured, offered and used in the State of New York, the standard ingredients of its composition and the range of variability from such standard or standards should be duly certified and officially filed at the office of the State Board of Health. There are medicinal compounds, of this kind, of such practical and extensive use, that their correct standards should be maintained by whoever makes or sells them.

This Board has appointed eight distinguished chemical analysts, located in various parts of the State, to serve under this law. Arrangements have been made for collecting the necessary samples of food, articles and drugs.

Whenever a citizen of this State desires to have samples of food or drugs tested, which are suspected of adulteration or other fault, he will please give notice by mail to the Secretary, or to the chairman of the committee of this Board under whose supervision the analyses and investigations are conducted, who will return his requests, etc., concerning the same.* The rules thus officially given in each case for procuring and sealing up samples for analysis should be followed.

REQUESTS.—All who are interested in promoting the welfare of life and health by guarding against adulterated and deleterious articles of food, beverages and medicines, will please carefully observe and inquire concerning the illegal traffic in such articles; and this Board specially requests that whenever any person is cognizant of a case, or of cases, in which there is, or seems to be, evidence of poisoning or injury from the use of any food-articles, beverages, drugs, condiments, and the accessories of food, information should be immediately given to the State Board of Health at its Central Office, Albany, and the reason for such opinion should be at once communicated, with the name of the informer. All such names and information will be so reserved, and the Board's actions will be so directly responsible, that no inconvenience shall result to informants.

The State Board of Health desires the fact to be well understood by the public, that this law originated as a national measure for the protection of the people, as recommended by the National Board of Health and National Board of Trade; and that in the State of New York its administration will be based upon effectual co-operation of the State Board of Health with the people and honest producers and tradesmen, and upon the faithfulness and skill of this Board's carefully selected chemical analysts.

On behalf of the State Board of Health,

ELISHA HARRIS, *Secretary.*

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*The communications may be addressed to the care of the Secretary of the Board, Albany.

[No. 24.]

AN ACT to prevent the adulteration of food or drugs.

[Chapter 407, Laws of 1881. Passed May 28, 1881.]

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

SECTION 1. No person shall, within this State, manufacture, have, offer for sale, or sell any article of food or drugs which is adulterated within the meaning of this act, and any person violating this provision shall be deemed guilty of a misdemeanor, and upon conviction thereof, shall be punished by fine not exceeding fifty dollars for the first offense, and not exceeding one hundred dollars for each subsequent offense.

§ 2. The term "food," as used in this act, shall include every article used for food or drink by man. The term "drug," as used in this act, shall include all medicines for internal and external use.

§ 3. An article shall be deemed to be adulterated within the meaning of this act—

a.— In the case of drugs.

1. If, when sold under or by a name recognized in the United States Pharmacopœia, it differs from the standard of strength, quality or purity laid down therein.

2. If, when sold under or by a name not recognized in the United States Pharmacopœia, but which is found in some other pharmacopœia or other standard work on Materia Medica, it differs materially from the standard of strength, quality or purity laid down in such work.

3. If its strength or purity fall below the professed standard under which it is sold.

b.— In the case of food or drink.

1. If any substance or substances has or have been mixed with it so as to reduce or lower or injuriously affect its quality or strength.

2. If any inferior or cheaper substance or substances have been substituted wholly or in part for the article.

3. If any valuable constituent of the article has been wholly or in part abstracted.

4. If it be an imitation of, or be sold under the name of, another article.

5. If it consists wholly or in part of a diseased or decomposed, or putrid or rotten, animal or vegetable substance, whether manufactured or not, or, in the case of milk, if it is the produce of a diseased animal.

6. If it be colored, or coated, or polished, or powdered, whereby damage is concealed, or it is made to appear better than it really is, or of greater value.

7. If it contain any added poisonous ingredient, or any ingredient which may render such article injurious to the health of a person consuming it: Provided, that the State Board of Health may, with the approval of the Governor, from time to time declare certain articles

or preparations to be exempt from the provisions of this act: And provided further, that the provisions of this act shall not apply to mixtures or compounds recognized as ordinary articles of food, provided that the same are not injurious to health and that the articles are distinctly labeled as a mixture, stating the components of the mixture.

§ 4. It shall be the duty of the State Board of Health to prepare and publish from time to time lists of the articles, mixtures or compounds declared to be exempt from the provisions of this act in accordance with the preceding section. The State Board of Health shall also from time to time fix the limits of variability permissible in any article of food or drug, or compound, the standard of which is not established by any national pharmacopœia.

§ 5. The State Board of Health shall take cognizance of the interests of the public health as it relates to the sale of food and drugs and the adulteration of the same, and make all necessary investigations and inquiries relating thereto. It shall also have the supervision of the appointment of public analysts and chemists, and upon its recommendation whenever it shall deem any such officers incompetent, the appointment of any and every such officer shall be revoked and be held to be void and of no effect. Within thirty days after the passage of this act, the State Board of Health shall meet and adopt such measures as may seem necessary to facilitate the enforcement of this act, and prepare rules and regulations with regard to the proper methods of collecting and examining articles of food or drugs, and for the appointment of the necessary inspectors and analysts; and the State Board of Health shall be authorized to expend, in addition to all sums already appropriated for said board, an amount not exceeding ten thousand dollars for the purpose of carrying out the provisions of this act. And the sum of ten thousand dollars is hereby appropriated out of any moneys in the treasury, not otherwise appropriated, for the purposes in this section provided.

§ 6. Every person selling or offering or exposing any article of food or drugs for sale, or delivering any article to purchasers, shall be bound to serve or supply any public analyst or other agent of the State or local board of health appointed under this act, who shall apply to him for that purpose, and on his tendering the value of the same, with a sample sufficient for the purpose of analysis of any article which is included in this act, and which is in the possession of the person selling, under a penalty not exceeding fifty dollars for a first offense, and one hundred dollars for a second and subsequent offenses.

§ 7. Any violation of the provisions of this act shall be treated and punished as a misdemeanor; and whoever shall impede, obstruct, hinder or otherwise prevent any analyst, inspector or prosecuting officer in the performance of his duty shall be guilty of a misdemeanor, and shall be liable to indictment and punishment therefor.

§ 8. Any acts or parts of acts inconsistent with the provisions of this act are hereby repealed.

§ 9. All the regulations and declarations of the State Board of Health made under this act, from time to time and promulgated, shall be printed in the statutes at large.

§ 10. This act shall take effect at the expiration of ninety days after it shall become a law.

[No. 46.]

STATE BOARD OF HEALTH OF NEW YORK.

CHAPTER 292, LAWS OF 1882.

AN ACT to regulate the standard of illuminating oils and fluids for the better protection of life, health and property.

PASSED June 6, 1882; three-fifths being present.

SECTION 1. No person, company or corporation shall manufacture or have in this State, or deal in, keep, sell or give away, for illuminating or heating purposes in lamps or stoves within this State, oil or burning fluid, whether the same be composed wholly or in part of naphtha, coal oil, petroleum or products manufactured therefrom, or of other substances or materials, which shall emit an inflammable vapor which will flash at a temperature below one hundred degrees by the Fahrenheit thermometer, according to the instrument and methods approved by the State board of health of New York.

§ 2 No oil or burning fluid, whether composed wholly or in part of coal oil and petroleum or their products, or other substance or material, which will ignite at a temperature below three hundred degrees by the Fahrenheit thermometer, shall be burned in any lamp, vessel or other stationary fixture of any kind, or carried as freight, in any passenger or baggage car, or passenger boat moved by steam power in this State, or in any stage or street car drawn by horses. Exceptions as regards the transportation of coal oil, petroleum and its products are hereby made when the same is securely packed in barrels or matallic packages, and permission is hereby granted for its carriage in passenger boats moved by steam power when there are no other public means of transportation. Any violation of this act shall be deemed a misdeameanor and subject the offending party or parties to a penalty not exceeding three hundred dollars, or imprisonment not exceeding six months, at the discretion of the court.

§ 3. It shall be the duty of the State board of health of New York to recommend and direct the nature of the test and instruments by which the illuminating oils, as hereinbefore described, shall be tested in accordance with this act. It shall be the duty of the public analysts who may now be employed by the State board of health, or who may be hereafter appointed, to test such samples of suspected illuminating oils or fluids as may be submitted to them under the rules to be adopted by the said board, for which service the said board shall provide reasonable compensation at the first quarterly meeting of the State board of health held after the passage of this act; it shall adopt such measures as may seem necessary to facilitate the enforcement of this act, and prepare rules and regulations with regard to the proper methods of collecting and examining suspected samples of illuminating oils, and the State board of health shall be authorized to expend, in addition to all sums already appropriated for said board, an amount not exceeding five thousand dollars for the purpose of carrying out the provisions of this act And the sum of five thousand dollars is hereby appropriated, out of any moneys in the treasury not otherwise appropriated, for the the purposes of this section provided.

§ 4. Naphtha and other light products of petroleum which will not stand the flash test required by this act may be used for illuminating or heating purposes only :—

In street lamps and open air receptacles apart from any building, factory or inhabitated house in which the vapor is burned.

In dwellings, factories or other places of business when vaporized in secure tanks or metallic generators made for that purpose in which the vapor so generated is used for lighting or heating.

For use in the manufacture of illuminating gas in gas manufactories, situated apart from dwellings and other buildings.

§ 5. It shall be the duty of all district-attorneys of the counties in this State to represent and prosecute in behalf of the people, within their respective counties, all cases of offenses arising under the provisions of this act.

§ 6. Nothing in this act shall be so construed as to interfere with the provisions of chapter seven hundred and forty-two of the laws of eighteen hundred and seventy-one, as regards the duties of the bureau of combustibles of the city of New York, or any other statutes not conflicting with this act, provided that nothing in this act shall be deemed to interfere with or supersede any regulation for the inspection and control of combustible materials in any city of this State made and established in pursuance of special or local laws or the charter of said city.

§ 7. All acts or parts of acts inconsistent with this act are hereby repealed.

§ 8. This act shall take effect sixty days after its passage.

[No. 46.]

STATE BOARD OF HEALTH OF NEW YORK.

Preliminary Statement Relating to the Law For Safety-Testing Illuminating Oils.

At a meeting of this Board, the 22d of June, its Secretary was directed to present a statement to the public preparatory to the official announcement of the rules, methods and instruments which will be adopted when the act takes effect.

This law, Chapter 292 of 1882, "to regulate the standard of illuminating oils and fluids, for the better protection of life, health and property," takes effect the first week in August, and is designed to prevent the dangerous exposure of explosive products of petroleum. As repeatedly suggested by the Governor, this law has been enacted for the protection of life and health. It is believed that the efforts for this purpose can work no hardship to any persons who use or deal in any legitimate illuminating oils. It is required that illuminating fluids which give off explosive vapor that will flash at a temperature below 100° Fahr., shall shall not be used for lighting purposes. Also that oils which ignite or burn at a temperature less than 300° Fahr., shall not be used upon railway passenger cars nor upon vessels moved by steam.

The few exceptions to these standards are permissible only when controlled by special mechanism and used in special kinds and places of lighting, as in street lamps, in gas making, etc. It is to be hoped that these exceptions will not prove disastrous to life.

As it is estimated that upwards of thirty thousand lives have been destroyed by the explosive products of petroleum during the brief period that they have been in use for lighting, this fact alone is sufficient reason for this new law and the present efforts to control and prevent the causes of such deplorable danger and harm to human life.

In view of the just demands of the public that the State Board of Health should devise suitable methods of instruction and official action to prevent fatal accidents from these products of petroleum, this Board more than a year ago provided for such investigations as should fully explain the causes of peril from, and the means of safety-testing of, the petroleum oils used in lighting. The result of this investigation is now printed as a chapter in the Board's Second Annual Report, and is also separately published for distribution throughout the State, as No. 45 of the Board's current series of SANITARY PAPERS for the people. In that document and in the duties now imposed upon this Board, it is deemed expedient to present the facts which all intelligent persons can readily understand concerning necessary precautions and means of security.

All these facts derive their importance from the circumstance that those very light and quickly vaporizable constituents of petroleum which escape from that substance at a temperature much below 100 deg's. Fah., are not always separated and taken away from the heavier elements of petroleum, and that the presence of even a small percentage of these naphthous oils and vapors will render an otherwise superior illuminating oil very dangerous from the liability to the forma-

tion of an explosive mixture of the naphthous vapor with common air, and inasmuch as these almost gaseous elements which thus endanger the untested oils impart brilliancy, or at least special facility in burning, there has been a strong temptation both to use and to offer for sale the kerosene oils which are thus dangerous. Testing to ascertain the presence or absence of the dangerously explosive element of the burning fluids is a duty to human life, and as the methods and apparatus for accurate testing must be in every respect trustworthy in order to be useful, this Board has undertaken to present correct and readily applied instructions upon the subject.

As required by section 3 of the act, this Board will adopt and promulgate at its quarterly meeting on the ninth of August, the rules which will govern its service in securing the testing and practical instructions required in giving effect to the law, and it is believed that public opinion and the common interests of purchasers and dealers concerned in the operation of the law, will facilitate its enforcement.

The State Board of Health hereby announces, some weeks in advance of the time when the law is to take effect, that it will be an imperative duty to administer it impartially and faithfully, and that it seems expedient to advise all whose interests or duties are connected with the using of, or dealing in, those kinds of illuminating oils which will not abide the standards fixed by the law, to consider that it will be necessary to prepare and decide to offer for sale only such standard materials as will abide the prescribed tests.

Success in this duty will depend in no small degree upon an enlightened public opinion which cannot fail to be created by a correct understanding of the facts now set forth in Document No. 45, before alluded to. It is prudent to state in advance that the obvious leniency of the law will warrant the most faithful and vigilant application of it; for it will work hardship to those only who either ignorantly or wantonly put in jeopardy the lives and domestic safety of people who must use kerosene for lighting.

The Board has resolved to send to the people the information they need for their protection against explosive illuminating oils. The experts and the chemists who have been in consultation are agreed as to the minimum limit of safety which the tests required by law are to establish as standards. All who deal in or use petroleum illuminating oils now have ample time and facilities to secure themselves against loss or harm; yet to do this they must understand and use the information which is offered, and which every local Board of Health, and every physician and chemist in the State can readily explain. All people wish an end to the "kerosene horrors," and since the refining of petroleum to any degree of safety for use has removed all excuses for offering or using explosive fluids, the law which takes effect in August is based upon the belief that all reasonable persons will respect its requirements, and that whosoever disregards them will do so at the peril of penalties which that law imposes.

Submitted and published by order of the Board.

ELISHA HARRIS, *Secretary.*

OFFICE OF STATE BOARD OF HEALTH OF NEW YORK,
ALBANY, *June* 24, 1882,

[No. 67.]

STATE BOARD OF HEALTH OF NEW YORK.

BUREAU OF VITAL STATISTICS.

An Abstract of the Statutes of New York Relating to Marriage Ceremonials, the Public Registration of Marriages, and the duty of Persons authorized to Solemnize Marriage.

Laws Concerning Marriage.

In order to meet requests often made for a concise statement of the Laws of the State of New York relating to the duty of persons authorized to solemnize marriage, the following summary of the laws upon this subject have been carefully revised:

I. — What Persons are Authorized to Solemnize Marriages, and to Certify such Solemnization?

(1.) Ministers of the Gospel and Priests of every denomination.
(2.) Mayors, Recorders and Aldermen of cities.
(3.) Judges of the County Courts and Justices of the Peace.
(*a.*) Jews and also those designated in the Statute as Quakers (Friends), are authorized to solemnize marriage in the manner and agreeably to the regulations of their respective societies.
(*b.*) The right and privilege of registry and authentication of a marriage under the Statute is made dependent on its being solemnized by one of the officers, magistrates, ministers or priests, or in the manner above referred to.

II. — Marriage is forbidden between what persons.

(1.) Between parents and children; grandparents and grandchildren of every degree; brothers and sisters, as well the half as of the whole blood relations; and all such marriages are incestuous and void. And these prohibitions extend to illegitimate as well as to legitimate children.
(2.) Between persons when either of the parties to a marriage shall be incapable, for want of age or understanding, or incapable from physical causes of entering into the marriage state; or when the consent of either party shall have been obtained by force or fraud.
(3.) Marriage is forbidden to any person during the life-time of any former husband or wife of such person, unless (1) the marriage with such former husband or wife shall have been annulled or dissolved for some other cause than the adultery of the said person; or (2) unless such former husband or wife shall have been finally sentenced to imprisonment for life.
(4.) Males under 14 and females under 12 years of age are incapable of consenting to marriage; and the Courts may divorce females mar-

ried under 14, without the consent of parents or guardians, if the marriage has not been ratified and there has not been cohabitation — since arriving at 14 years of age.

(5.) Persons authorized to perform the marriage ceremony are liable to be punished by fine or imprisonment if with knowledge they solemnize the ceremony between parties either of which is under the age of consent, an idiot or lunatic, or as to which there is a legal impediment existing.

III.—What is required of the Clergyman, Magistrate or other person who solemnizes a Marriage, as regards the ceremonials?

When solemnized by a minister or priest, the ceremony of marriage shall be according to the forms and customs of the church or society to which he belongs. When solemnized by a magistrate no particular form shall be required, except that the parties shall solemnly declare in the presence of the magistrate and the attending witness or witnesses that they take each other as husband and wife. In every case there shall be at least one witness, beside the minister or magistrate, present at the ceremony.

IV.—What is required as regards the official duty toward the persons about to be married.

"It shall be the duty of every minister, priest or magistrate required to solemnize a marriage to ascertain,—

"(1.) The Christian and surnames of the parties; their respective places of residence; and that they are of sufficient age to be capable in law of contracting marriage;

"(2.) The names and places of residence of two of the attesting witnesses, if more than one be present, and if not, the name and place of residence of such witness. He shall enter the facts so ascertained and the day on which such marriage is solemnized, in a book to be kept by him for that purpose.

"(3.) If either of the parties, between whom the marriage is to be solemnized, shall not be personally known to him, the minister or magistrate shall ascertain from the respective parties their right to contract marriage, and, for that purpose, he may examine the parties, or either of them, or any person under oath, which he is hereby authorized to administer, which examination shall be reduced to writing and subscribed by the parties, and either of the respective parties making a false statement under this oath shall be deemed guilty of willful and corrupt perjury, and shall be liable therefor."

The right of husband and wife to demand and receive a Certificate of their Marriage, at the hands of the Minister or Magistrate; what such certificate shall contain.

[This certificate is independent of the one returned to the Bureau of Vital Statistics.]

Whenever a marriage shall have been solemnized within this State, pursuant to this title, the minister or magistrate by whom the marriage was solemnized shall furnish on request, *to either party*, a certificate thereof, specifying —

(1.) The names and places of residence of the parties married, and that they were known to such minister or magistrate, or were satisfac-

torily proved by the oath of the parties themselves, or of a person known to him, that they were the persons described in such certificate and that he had ascertained that they were of sufficient age to contract marriage;

(2.) The name and place of residence of the attesting witness or witnesses, and

(3.) The time and place of such marriage;

(4.) The certificate shall also state that after due inquiry made, there appeared no lawful impediment to such marriage; and it shall be signed by the person making it.

V.—What is required in regard to the certified returns to be rendered to the Registering Officer of Vital Statistics.

(1.) One copy of a duplicate record, that has been made out in accordance with the forms prescribed by the State Bureau of Vital Statistics, shall be forwarded to the Registry Officer of the town, village or city where the ceremonial occurred, within three days of the marriage, and by such means as will insure its delivery, by mail or hand. The professional attestant of the marriage is by law responsible for required completeness and delivery of the marriage certificate, whoever assists in these duties.

(2.) The person who solemnizes the marriage must keep a perfect duplicate of the copy of record which has been forwarded to the Registry Officer of the Board of Health.

(3.) All names of persons must be accurately spelled and distinctly written.

The foregoing summary, comprising the chief points upon which general information is often desired, especially by parents, clergymen and magistrates, is respectfully submitted to all persons concerned in the solemnization and formal witnessing and attesting of the marriage ceremonial in the State of New York.

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